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ELECTRIC RAILWAY JOURNAL

142

A PROGRESSIVE policy of "betterment" has put this fine new observation-parlor car on the Chicago, North Shore & Milwaukee tracks.

And the same policy has equipped it with Miller Trolley Shoes—like every other "North Shore" high-speed car.

Miller Trolley Shoes have long proved their economy and greater efficiency on this famous road.

Get full details

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MILLER TROLLEY SHOES—

MILLER TROLLEY SHOE CO.
295 Columbia Road
Boston-21, Mass.
Western Representative:
Economy Electric Devices Co.
1500 Old Colony Bldg., Chicago, Ill.

Mass Transportation

"Joe," ejaculated the Vice President, "that multiple unit train represents real modern transportation. The Board of Directors and the city authorities are all delighted with the very favorable impression train operation has made on the public generally. The smoothness of operation, the increased schedule speeds with reduced conjestion and confusion have given everybody a new sensation and viewpoint in street car service."

"That's all true," responded Joe smiling. "Westinghouse HL control costs something more, but the results speak for themselves. I predict that every large city will adopt real train operation, such as we have, within a few years."

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

W WESTINGHOUSE ELECTRIC

Westinghouse

Vol. 62, *No.* 9 New York, September 1, 1923 354

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ELECTRIC RAILWAY JOURNAL

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*We have bought and added a paper to the group since we began showing you through our plant.

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Number of copies printed 5,875

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

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Published weekly
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
Printed in U. S. A.

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Send For This Catalogue

WESTINGHOUSE ELECTRIC

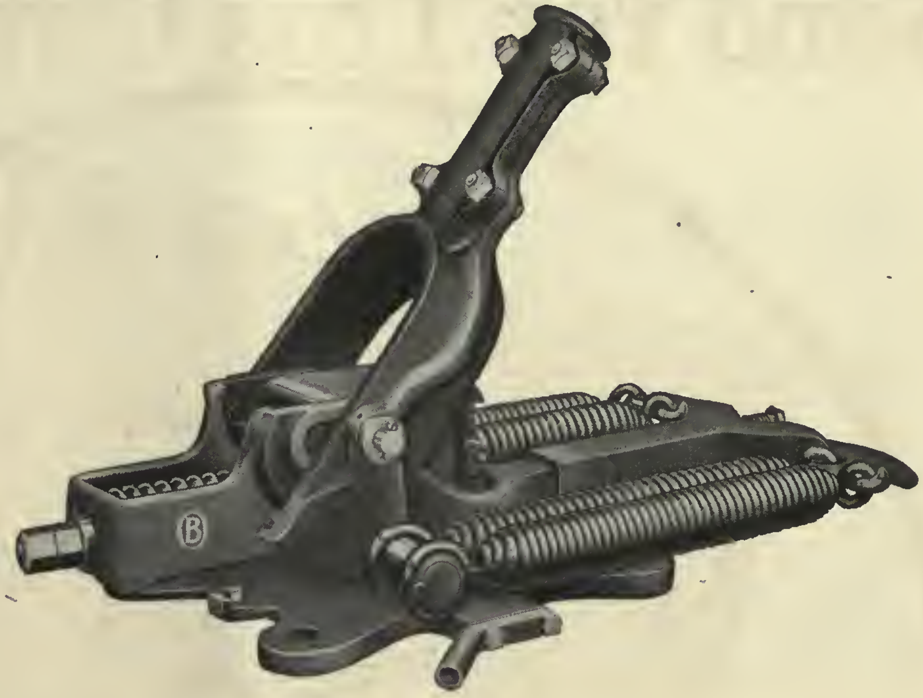
It illustrates and describes the complete line of Westinghouse Overhead Line Material and Porcelain Insulators.

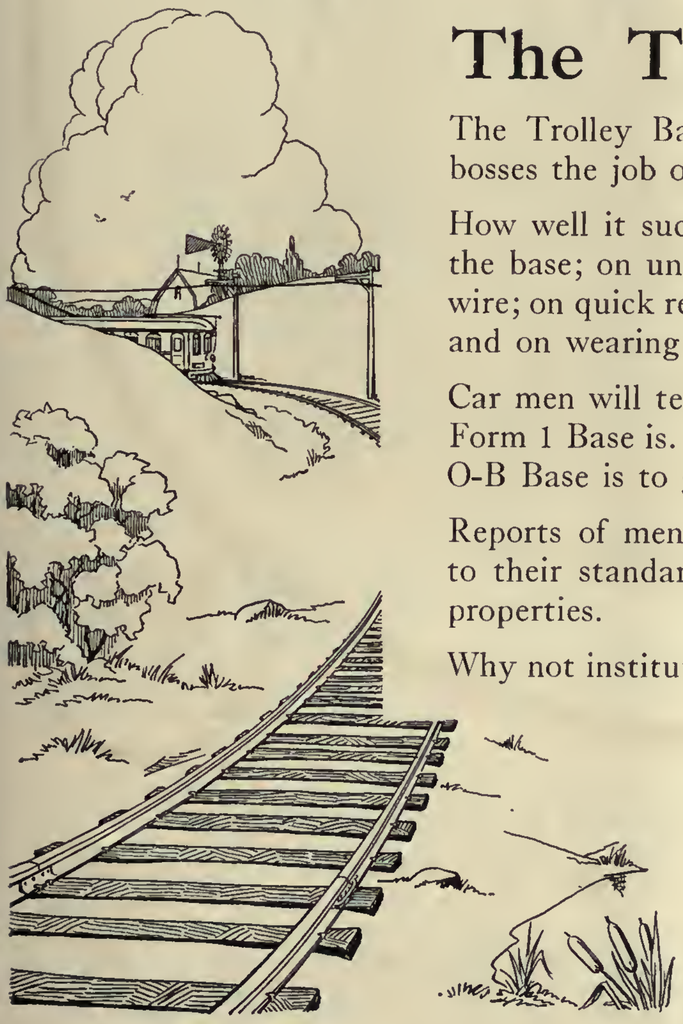
MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

O-B Form 1
Trolley Box
Patented





The Trolley Wheel's Boss

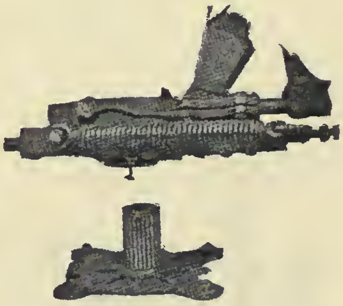
The Trolley Base is the trolley wheel's guiding hand. It bosses the job of keeping the wheel on the wire all the time.

How well it succeeds depends on free horizontal rotation of the base; on uniformity of pressure of the wheel against the wire; on quick response of the base to unevenness in overhead; and on wearing qualities of the base itself.

Car men will tell you how good and reliable a Boss the O-B Form 1 Base is. Maintenance men will tell you how easy the O-B Base is to get at for inspection.

Reports of men actually working with O-B Bases have led to their standardization on many of the prominent railway properties.

Why not institute a trial, Yourself?



Take out a single screw and the O-B Base will lift off its stem casting. Every vital part is exposed. Note the roller bearing on stem and the hook-down feature on pole fork.

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

Member American Electric Railway Association AERA 1923

New York Philadelphia Pittsburgh Charleston, W Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Insurance plus Marsh & McLennan Service

A Worth While Saving

The Service of Marsh & McLennan Engineers results in a direct dollars and cents saving in insurance cost.

A large Eastern corporation, for example, was able to reduce its insurance cost from $17.50 per thousand to $4.30 per thousand, by carrying out the recommendations of our engineering service.

We will be glad to outline this service to business executives who are interested in reducing insurance cost.

MARSH & McLENNAN
175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
New York
Detroit
Denver
Duluth
Columbus
San Francisco
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Cleveland
Winnipeg
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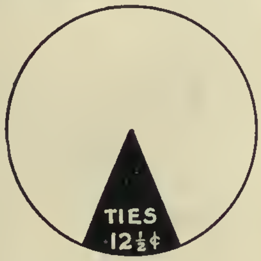
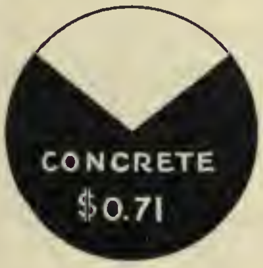
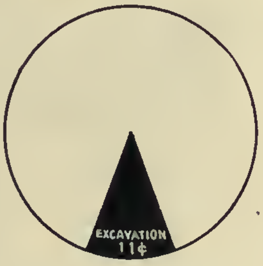
London

Where the Track Dollar Goes!

(Note:—Percentage figures from an estimate to base of rail based on wood ties on six inches of concrete.)







Re-orders are nearly 86% of our 1923 first half business because first orders average smaller than re-orders — for only after trial do we expect, or get, all of our customers track reconstruction program. This pleases us, for it confirms our high opinion of Steel Twin Tie Track.

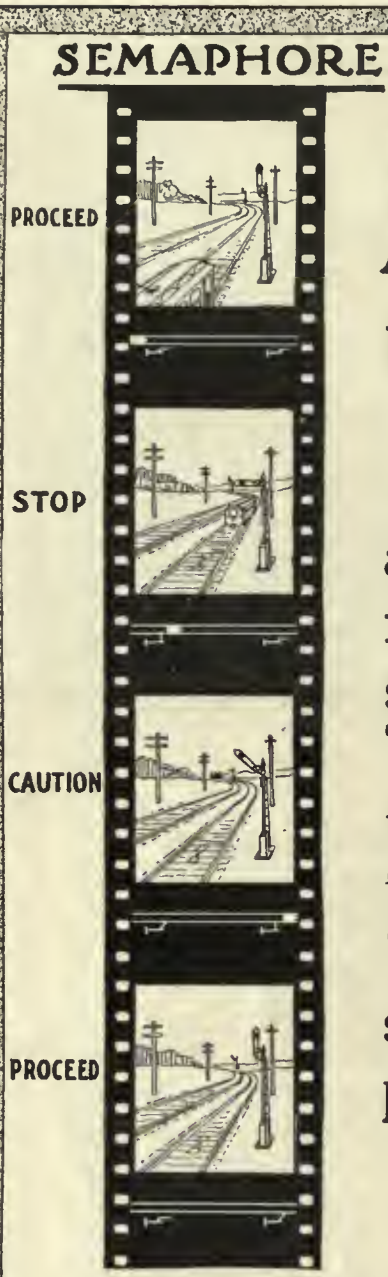
Steel Tie Construction Reduces the Investment in Idle Material

You call it *building track!* Yet a large part of your cost is for a smoothly paved space for other traffic. Usually this paving is supported by a concrete foundation, no part of which carries any of your track load—if you use wood ties.

Twin Tie Track is the economic remedy for just that condition. No matter what rail you use the bottom of a Twin Tie is six inches nearer the street grade than a wood tie. Labor, excavation and amount of concrete are reduced; the latter is reinforced; the bearing on both concrete and subgrade is increased and, as users will testify, the finished job has longer life and better riding qualities than any other construction. Note that initial orders are smaller than re-orders (at left) and why. Start investigating Steel Tie Construction today!

THE INTERNATIONAL STEEL TIE CO.
Cleveland

Steel Twin Tie Track



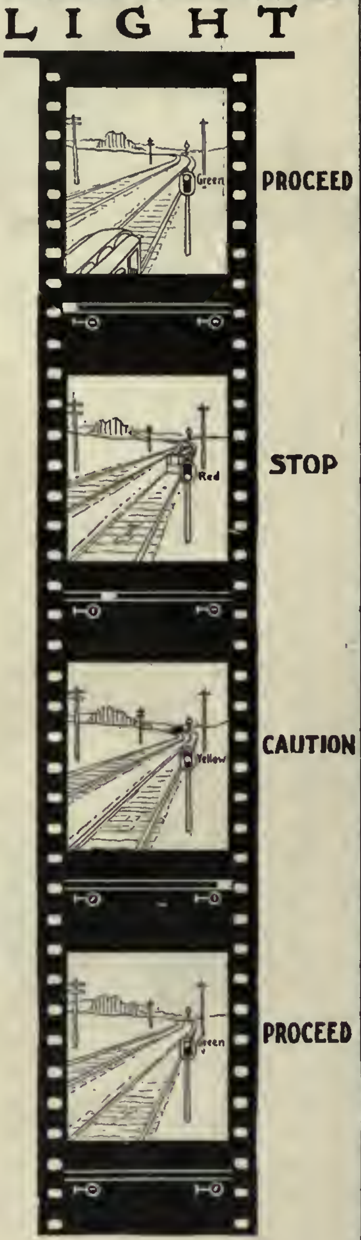
FOR DOUBLE TRACK

Interurban Railways

Union automatic ▪ block signals ▪

afford a simple system of indications easily understood by trainmen.

The continuous A. C. track circuit makes possible the use of "polarized" or "wireless" control and insures the display of the proper indication at all times.



On the W. B. & A. Railroad

UNION EQUIPMENT WILL SOLVE YOUR INTERURBAN TRAFFIC PROBLEMS

Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your line.*

Union Switch & Signal Co.

SWISSVALE, PA.

Trade Mark

Now Available

The New Electric Service Car Equipment Catalog— No. 7

Bigger, better and more complete!

688 pages

It doesn't cost you anything to have and to keep this valuable reference book on your desk.

Ask our representative to go over it with you on his next visit. He'll show you in it some high spots of the most up-to-date developments in car equipment.

Get it and read it!

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

BOSTON
88 Broad St.

PITTSBURGH
829 Oliver Building

SCRANTON
316 N. Washington Ave.

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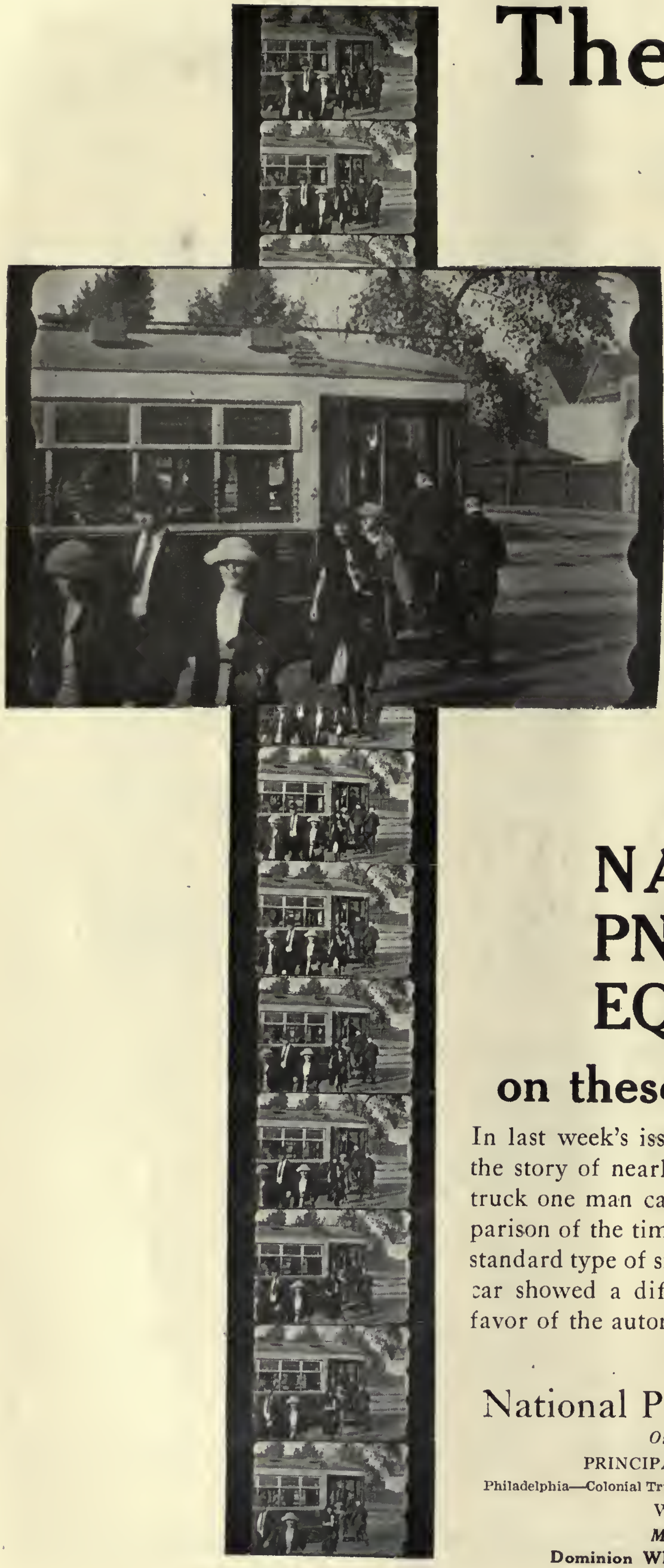
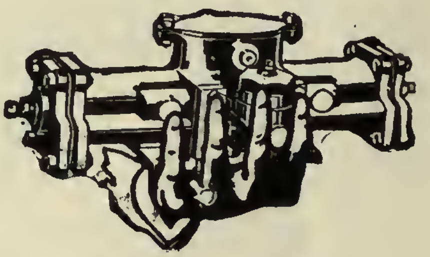
The Automati



Exit doors opera



NATIONAL PNEUMATIC EQUIPMENT

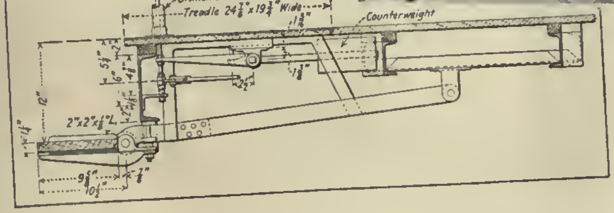
on these remarkable cars

In last week's issue of Electric Railway Journal, was the story of nearly a year's operation of these double-truck one man cars in a large Western City. A comparison of the time for interchanging passengers on the standard type of single door car and this automatic door car showed a difference that runs as high as 86% in favor of the automatic door construction.

National Pneumatic Company, Inc.
Originators and Manufacturers
PRINCIPAL OFFICE: 50 Church St., NEW YORK
Philadelphia—Colonial Trust Bldg. Chicago—McCormick Bldg.
Works—Rahway, New Jersey
Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

Door
Car

utomatically!



NATIONAL PNEUMATIC COOPERATION

in the development work

The automatic exit door does it! It opens only to pass outgoing passengers and then it closes itself. Incoming passengers cannot enter the exit door. Selective control of both doors is provided without requiring additional attention from the operator.

National Pneumatic Equipment from step and treadle to door engine, combined with National Pneumatic cooperation represent important factors in this remarkable development.

National Pneumatic Company, Inc.
Originators and Manufacturers
PRINCIPAL OFFICE: 50 Church St., NEW YORK
Philadelphia—Colonial Trust Bldg. Chicago—McCormick Bldg.
Works—Rahway, New Jersey
Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.

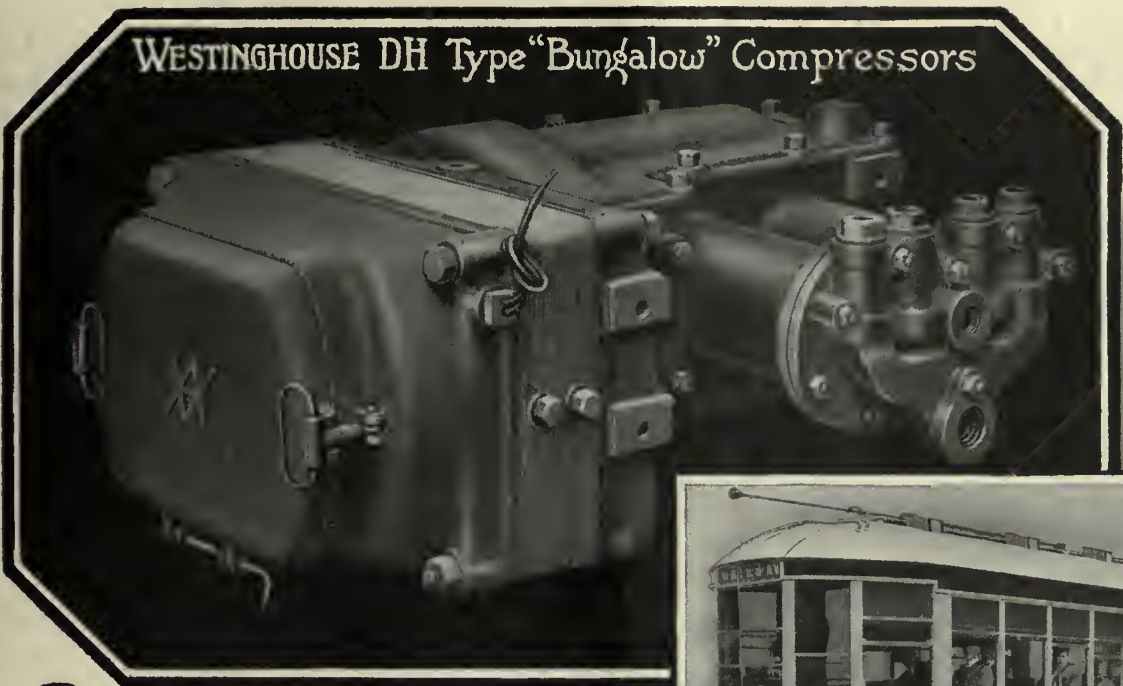
Philadelphia Knows—

It was not "hasty action" or "snap judgment" that caused the Philadelphia Rapid Transit Co. to place its recent record-breaking order for 520 new Safety Cars.

Philadelphia already has 181 cars in service which were converted for Safety Car operation by the use of our equipment. The huge order for new cars came as the result of what the old cars had done.

Nothing truer has been said than that "One Safety Car Sells Another."

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



3 Sizes— Properly Constructed for Low-Built Cars

EASY TO GET AT

DH Compressors are highly popular with maintenance men owing to the quick and easy manner in which access may be gained to all parts. This feature encourages regular and careful inspection.

Most cars constructed at present are of the low-floor type, and for such cars the DH Compressor was "made-to-order."

In addition to fitting snugly in small spaces and providing ample track clearance for the lowest cars, DH Compressors offer a degree of mechanical perfection which appeals to the cautious buyer with an eye to steady, dependable service, long life and low maintenance cost.

Three sizes—10, 16 and 25 cu. ft. displacement—all of the same general design, therefore all properly constructed for low-built cars.

Westinghouse Traction Brake Company
General Office and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES

International Ties

are carefully graded, separated and piled

THE extreme care and personal supervision of ties immediately after they are cut and shipped to the seasoning yard is in large measure responsible for the uniformity, soundness and long life of International Ties.

At the plant expert timbermen and treating engineers carefully check the ties as they come into the yard. For instance they will not permit a fungus tie to be stacked with other ties. The ties are segregated by grades and stacked in a manner which allows maximum circulation of air and promotes early seasoning with minimum danger of decay.

There is no mixture of ties to confuse an inexperienced tie inspector—in fact we offer every possible assistance to make a thorough examination.

Every International Tie is a standard specification Tie. We invite your inquiries and personal investigation of plant facilities, producing and treating methods of International Products.

International Creosoting & Construction Co.
General Office—Galveston, Texas
Plants: Texarkana, Texas Beaumont, Texas
Galveston, Texas

A Portfolio for Executives
on a live business subject

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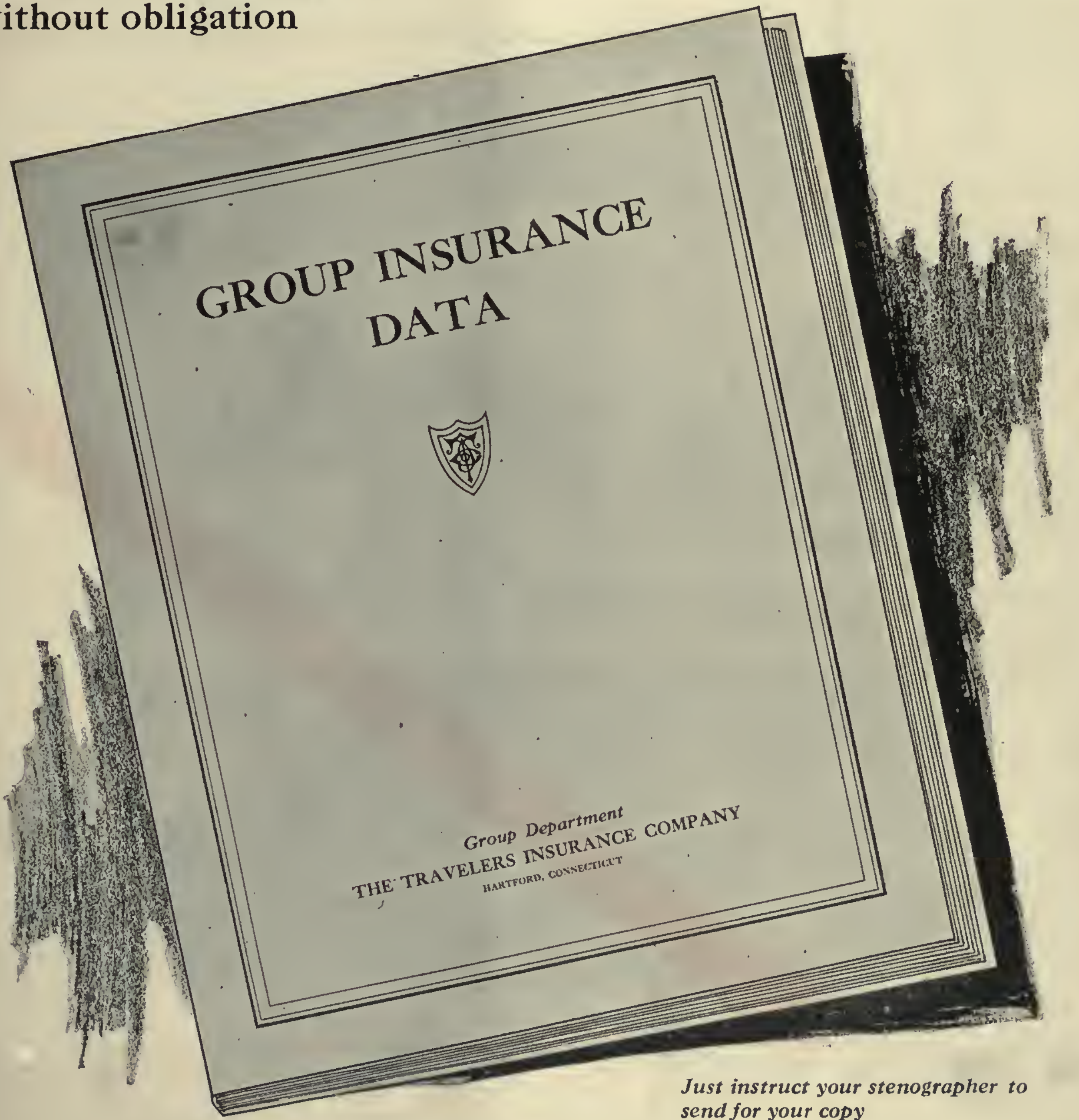
without obligation



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send for your copy*

THE TRAVELERS INSURANCE COMPANY
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THE TRAVELERS INDEMNITY COMPANY
Connecticut

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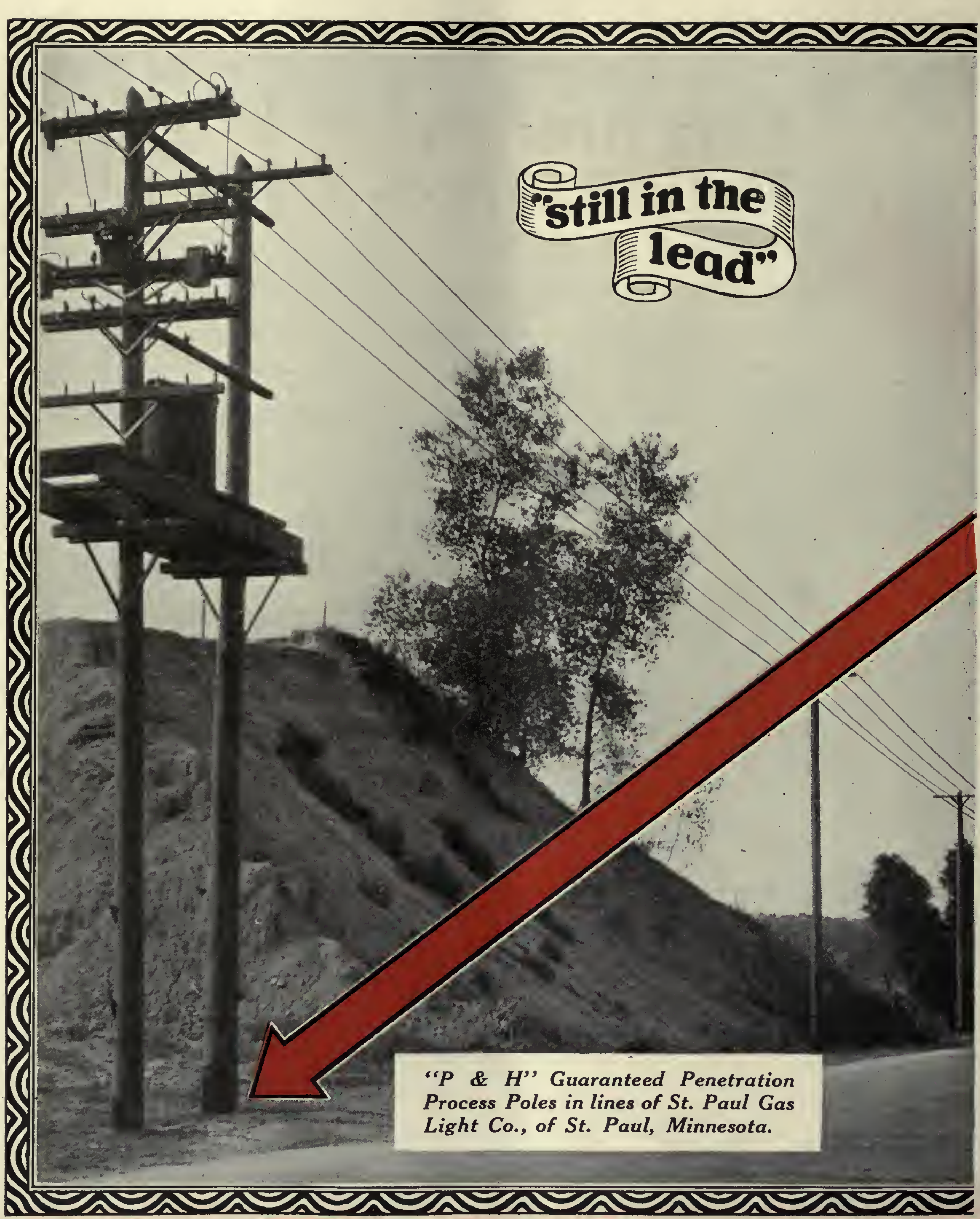
employers than have chosen any other company*



"P & H" Guaranteed Penetration Process Poles in lines of St. Paul Gas Light Co., of St. Paul, Minnesota.

PAGE &

MINNEAPOLIS, MINN.

Can you afford LESS Reliable Pole Service!

Can you afford to invest your pole money in anything short of the most reliable pole service and the longest pole life it is possible to buy?

You are **sure** of getting the highest degree of pole reliability and durability yet attained in the pole industry, when you specify poles butt-treated by the

"P&H" Guaranteed Penetration Process

It is backed by a written, money-back guarantee to **deliver** a full **one-half inch** uniform penetration throughout the ground line area. The Butt-Treating price is refunded on any pole that does not show the full specified penetration. Can you afford to take chances with less certain results?

There is only one **"Guaranteed Penetration Process"**-the "P & H." It insures the best results. Be sure you get the genuine.

We can fill any pole needs—for treated and untreated Northern White and Western Red Cedar poles—or for any form of butt-treatment.

Prompt Shipment assured by the convenient location of our yards in the North Central and Western States.

Get the facts—write for interesting folder
on the Butt-Treatment of cedar poles.

Copyright 1922, by P & H Co.

HILL CO.

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Chicago, Ill., 19 So. LaSalle St.

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Omaha, Neb., 513 Electric Bldg.

Houston, Texas, 1111 Carter Bldg.
Dallas, Texas, 311 Sumpter Bldg.

Buffalo, N. Y. 950 Ellicott Sq. Bldg.
Louisville, Ky. 1416 Starks Bldg.

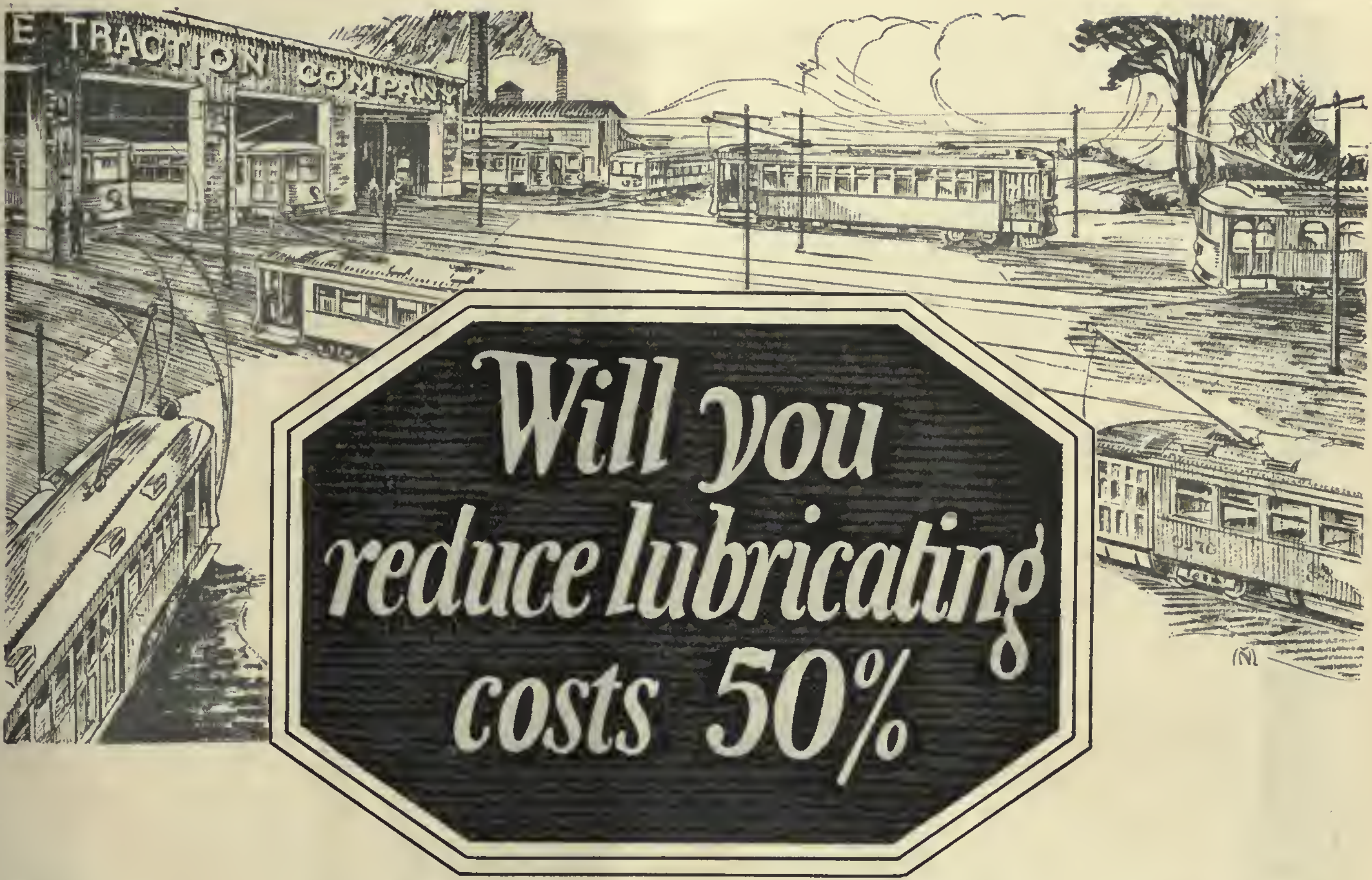
Snow! — its Removal

As you read this your immediate problems may not, probably don't in fact, include snow. Yet in the back of your head you undoubtedly are lining up a plan for your next Winter's campaign for keeping tracks open and headways unimpaired. You're not going to wait for snow before you get ready to fight it.

Let us, therefore, remind you that approximately ninety-five per cent of all the electric snow sweeping equipment used in the United States and Canada is of McGuire-Cummings make. McGuire-Cummings sweepers *keep* tracks clear. When it starts to snow they start to sweep—that's all there is to it. Depend upon McGuire-Cummings sweepers for the solution of your snow problem next Winter.

McGUIRE-CUMMINGS MFG. CO.
General Offices
111 West Monroe St., Chicago, Ill.

City and Interurban Cars and Trucks, Safety Cars, Combination and Work Cars, Snow Sweepers, Electric Locomotives



Will you reduce lubricating costs 50%

YOU may benefit directly by reducing your cost per car mile, if you will take advantage of the lubricating experience of the Standard Oil Company (Indiana).

As an example of the worth-while saving which it is possible for you to make, we cite the experience of an Indiana traction company which reduced the cost of lubricating their equipment fifty per cent by following our recommendations. (We will be glad to give you the name upon request.)

When our engineers first called upon the company, and, after careful study of their requirements recommended that certain oils and greases be used, they were a bit skeptical that any saving could be accomplished. As is our custom in such cases, we offered to make a six months' test with the understanding that the cost to them would be no more than usual.

Standard T. M. and L. C. Motor Journal Oils

for their car and motor journals was one of our recommendations. These oils are made of especially selected lubricating stocks and are refined for this *one* purpose. Therefore, they do not glaze or harden on the waste; one point alone which reduced labor cost to the company by extending the oiling periods. Nor was it necessary to clean or renew the waste so frequently, and when it was, the cleaning was an easy matter.

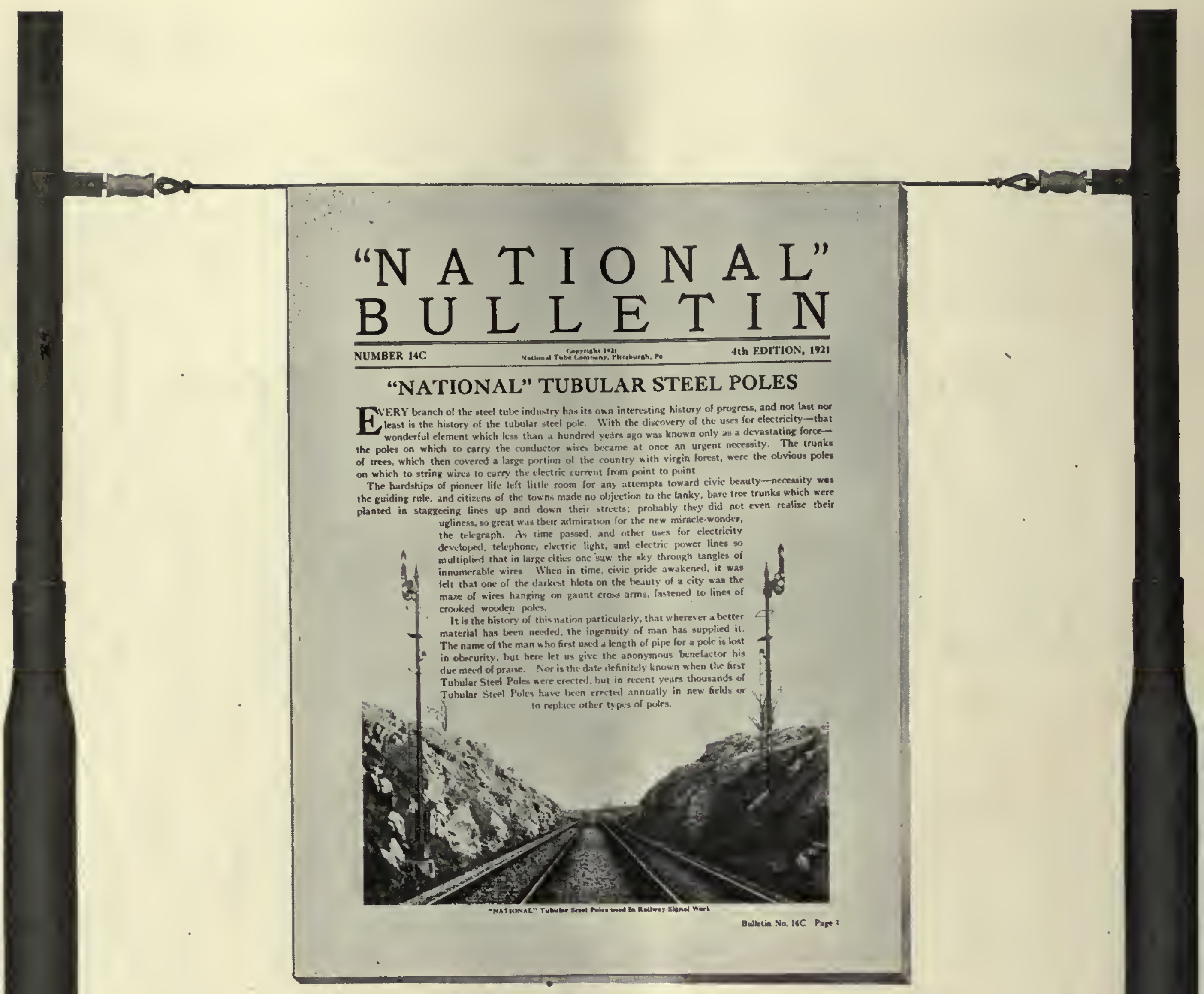
The oil, itself, lubricated the bearings perfectly, preventing excessive wear and the consequent costly renewals. And the usual trouble, time and expense which are always present when hot boxes occur, were practically eliminated.

Of course, the success of our six months' test, using for the other equipment oils and greases in every way as efficient as the journal oils, was foretold.

Standard Oils and Greases are now used on all equipment of this Indiana line, and the lubricating cost per car mile is less than fifty per cent of what it was before their use.

This example is by no means exceptional. If you are skeptical of the saving we can accomplish by proper lubrication with Standard Oils and Greases, we will be glad to conduct a test for you, similar to the one we have cited above. You have every advantage to gain by inviting us to send one of our corps of lubricating engineers to see you. He will be more than glad of the opportunity of advising with you. Address

STANDARD OIL COMPANY
(INDIANA)
910 S. Michigan Avenue **Chicago, Illinois**



"NATIONAL" BULLETIN

NUMBER 14C — Copyright 1921 National Tube Company, Pittsburgh, Pa — 4th EDITION, 1921

"NATIONAL" TUBULAR STEEL POLES

EVERY branch of the steel tube industry has its own interesting history of progress, and not last nor least is the history of the tubular steel pole. With the discovery of the uses for electricity—that wonderful element which less than a hundred years ago was known only as a devastating force—the poles on which to carry the conductor wires became at once an urgent necessity. The trunks of trees, which then covered a large portion of the country with virgin forest, were the obvious poles on which to string wires to carry the electric current from point to point

The hardships of pioneer life left little room for any attempts toward civic beauty—necessity was the guiding rule, and citizens of the towns made no objection to the lanky, bare tree trunks which were planted in staggeeing lines up and down their streets; probably they did not even realize their ugliness, so great was their admiration for the new miracle-wonder, the telegraph. As time passed, and other uses for electricity developed, telephone, electric light, and electric power lines so multiplied that in large cities one saw the sky through tangles of innumerable wires When in time, civic pride awakened, it was felt that one of the darkest blots on the beauty of a city was the maze of wires hanging on gaunt cross arms, fastened to lines of crooked wooden poles.

It is the history of this nation particularly, that wherever a better material has been needed, the ingenuity of man has supplied it. The name of the man who first used a length of pipe for a pole is lost in obscurity, but here let us give the anonymous benefactor his due meed of praise. Nor is the date definitely known when the first Tubular Steel Poles were erected, but in recent years thousands of Tubular Steel Poles have been erected annually in new fields or to replace other types of poles.

"NATIONAL" Tubular Steel Poles used in Railway Signal Work

Bulletin No. 14C Page 1

Worth While Information on Tubular Steel Poles

CONTENTS OF NATIONAL BULLETIN No. 14:

Tubular Steel Poles for (1) Trolley Lines or Tramways (2) Telegraph and Telephone Lines (3) Lighting Poles (4) Transmission Lines; Characteristics and Advantages of "NATIONAL" Tubular Steel Poles; Joints; Tests; Modern practice with regard to Sizes, Lengths, Joints, Repairs, etc., of Poles; Considerations of Installation and Service; Pressures, Stresses and Loads of Poles; Tables, giving essential pole details; Tables giving properties of Pipe; Ornaments and Fittings. This Bulletin also contains eighty-three illustrations. A very desirable publication for any executive or engineer interested in line pole installations.

Send for your copy of this Bulletin to-day

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

General Sales Offices: Frick Building

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With Galena Oils and Service in the Field

Galena lubrication stands not only on its matchless records established in tests with other oils, but on the everyday performance that it is now demonstrating on electric railroads in every section of the country.

The discriminating buyer who measures the service received from lubricants, rather than their price per gallon, quickly perceives the economy of Galena Lubrication, as well as its desirability on account of superior efficiency.

Keeping a check on lubrication is not a difficult proposition. Mileage, hot boxes, time losses and repairs or replacements due to inefficient lubrication, are the only sure means of determining the nature of your lubrication service as well as its ultimate cost. When such records are kept Galena Lubrication invariably proves its value by the actual figures on the results obtained.

From our Service Engineer's Reports*

"A year ago an association was formed, to the members of which a monthly report showing pull-ins, the cause, and the mileage, is submitted. Since the installation of Galena lubricants on this property the reports indicate that mileage per pull-in has increased from about 8,000 to over 20,000. Last month it was 32,000."

——— o ———

"For the first few months after the change to Galena it was considered necessary to use the same amount of oil as was used of competitors, about 100 gallons per month. This has now been reduced to 28 gallons, producing faultless service, and we anticipate that next month's requirements will not exceed 20 gallons."

"During the time competitor was furnishing their material there was considerable trouble with armature bearings, losing several armatures. An actual record of mileage per set of bearings was started, and continued when the change was made to Galena material. The operating conditions were more favorable when using the other oils as the past winter has been unusually severe. Mileage per set of bearings with the other lubricants: 8,474, 4,235, 2,944, 2,197, 2,780. For the same period after Galena lubricants were installed: 12,126, 13,781, 17,777, 17,101, 19,697. We have now sets that have run up to 25,500 miles and still in service."

**These excerpts are taken from the weekly reports of our Service Engineers. We vouch for their reliability and accuracy in every detail.*

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You have to know the motor in order to specify its brushes. The brushes are as much a part of the motor as its coils, armature, or the frame. They give best commutation only when suited to the motor's characteristics and its job.

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Drawing from this experience with motors, their design, manufacture, and application, G-E brush specialists are well equipped. Why not submit to them your problem?

General Electric Company
Schenectady, N. Y.

40-242

GENERAL ELECTRIC

New York, Saturday, September 1, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 9

The Biggest Convention Is in Sight

AS THIS issue goes to press, 68,330 sq.ft. of exhibit floor space has been sold for the Atlantic City convention of the American Electric Railway Association, Oct. 8 to 12. This is more than 6,000 sq.ft. more than has ever been sold before at any A. E. R. A. convention. It means that the greatest convention of the association's history is probably to be had this fall. It means that 143 manufacturers have planned to bring before the railway men of all departments, including the accountants this year for the first time, new or improved equipment that will help them do their work better and more economically. Railway men can ill afford to miss such an opportunity as this, for the great need of the day in railway transportation is to modernize. These exhibits will give many new ideas for use in this direction. A lot of development work has been going on this last year and it is going to make the convention unusually interesting and profitable. With this prospect in sight, executives will be justified in authorizing a liberal delegation of department heads and principal assistants to make the trip to the convention.

Systematic Publicity Movement Is Making Headway

THE systematic business-like method of bringing the plain facts about the public utilities to the general public through the work of the state public utility information committees has spread until there are now only fourteen states in the Union without such service, according to a recent report. The movement originated in Illinois, and largely through the initiative of the men behind the Illinois committee this plan of publicity work has been set in operation to cover thirty-four states.

The accomplishments of these committees have already been great, but the combined results of all this work will be a profound influence for good as the accumulative effect is realized, provided the present high purpose of the matter sent out to the newspapers is maintained. On that basis it is believed that the time is well within sight when it will be most difficult for the unscrupulous politician and demagogue to make any headway in trying to spread misinformation about the utilities, for the man on the street will already have a good deal of knowledge of the utility business in his own mind and will not be so susceptible to the derogatory statements and misrepresentation that have been heeded in times past.

Of course the state committee work is just one of many plans for informing the public, but it is one of the best. It is these activities which are at last getting into full swing that give reassurance of the fair treatment of the utilities and of their financial success in the future. The very intelligent manner in which many newspapers have spoken editorially about the recent Public Service Railway settlement plan may be indicative of some of the subtle effect of the railway publicity work, for while the metropolitan dailies have not printed so much of the material sent out by the committees, their editorial writers have been noting and absorbing it. In fact, from their check on the papers, the information committees can cite many cases where an antagonistic editorial policy has been transformed into a friendly one as the continuous flow of facts has made its impression.

Much Is Yet to Be Learned in New Jersey

IN GENERAL the situation in New Jersey, where the Public Service Railway has been shut down since Aug. 1, remains unchanged. A hearing has been held on the company's proposed plan of settlement, as detailed in the news pages in this issue. The hearing brought forth practically no constructive criticism nor substitute plan, although the need for the railway was shown by the insistence, of nearly all the public officials who testified, that the railway start operation at once and talk afterward. There has also been some talk on the part of public officials of the possibility of throwing the company into a receivership. But nothing definite has transpired that would indicate an early resumption of service. Out of the hearing, and as the result of a fairly wide canvass of business men and other people in the Public Service Railway territory by JOURNAL editors, one gathers the following general impressions about the situation.

A great part of the people have not yet come to realize that they must have the trolleys back, nor that they cannot have both bus and railway in competitive services. It may take another month before these things are appreciated, for the month of August has been a particularly poor one in which to demonstrate them. With the return of many residents from their summering and vacation places, with the opening of schools and the beginning of the fall business season, the need for the return of the trolley will become increasingly felt. And of course the continued absence of the trolleys is about the only way that the necessity for correction of the unfair competitive operation that has prevailed can be quickly brought home.

In other words, now that the railway has taken the course of shutting down, it may be best to remain shut down until it is assured an equitable basis on which to operate in the future. It cannot be expected to operate again under conditions that permit the bus to give base service where business is good, leaving the railway to provide the unprofitable long-haul service, the light territory service and the peak-load service. Freed of all obligations as to rush-hour reserve capacity, as to unprofitable line service and as to most of the tax burdens which the railway must pay, the buses have been in a position to take the cream, while depending on the railway to make up all their deficiencies. This situation will gradually come to be realized as the people in the outlying territories are heard from. These people are hardest hit by the shutdown, because in the long stretches outside the larger towns they are getting little or no bus service and are enduring a real hardship. Furthermore business is being hurt, though some merchants seem reticent about admitting or discussing it. When this factor becomes more pronounced, business interests will no doubt bring some pressure to bear which may be helpful in developing the viewpoint of public officials on the need for acceptance of the railway plan.

Another aspect that must be learned is this. One of the most commonly voiced objections to the Public Service plan is against turning over the 5-cent buses to the railway to operate at 7 cents. The 2 cents difference indicated is more apparent than real because the 5-cent bus does not issue a transfer, and for a continuous ride in one direction it charges another fare or two as the distance gets much beyond a comparatively short-haul limit. Furthermore, there is scarcely any through service and people must frequently transfer from one bus to another several times in making a not unusual trip and must pay a new fare on each bus. Hence the people must come to understand that the difference between these rates of fare is a matter of difference in value received—a difference probably greater than the 2-cent differential in rate. Or possibly a quicker way would be for the company to set up a 5-cent rate of fare on a basis comparable with the bus, collecting one nickel, pay-enter, on the trip to the center of a city, and another, pay-leave, on the outbound run, as is done on the Eastern Massachusetts Street Railway system. The basic nickel fare has a great appeal and possibly it could be worked out to provide adequate revenue in New Jersey. It might also tend to win public approval in some Jersey communities if the company could get away from the uniform state-wide rate and charge whatever rate was proper for the conditions in each city.

Whatever the details of the solution, it is evident that the public of New Jersey must come to understand that it cannot expect railway service to continue while imposing conditions under which the railway cannot possibly live. If this lesson is brought home, it will serve as the most important of the several precedents established to that effect—Toledo, Bridgeport, Des Moines, Saginaw.

Study the Advance Engineering Reports Before Convention Time

IT IS quite certain that the advance reports of the various committees of the Engineering Association will be distributed about Sept. 1. Their receipt by the membership approximately five weeks before the convention opens at Atlantic City should give every member ample opportunity to study the reports thoroughly and to be prepared to discuss them on the convention floor.

If the advance distribution is effected as planned, there can be no good reason for anyone justly to say there has been no chance to study the reports in order to prepare comments.

The committees have been very industrious, and valuable work has been done. This includes the intensive study given to the Engineering Manual with the intent of providing material for its prospective and much needed revision. The work of the officers and committees deserves the support of the membership, and this will best be shown by ample discussion of reports at the convention, which their early circulation will permit.

Ample time for this will be allowed, and the sessions will be convened on time following the precedent set at Chicago last year. With ahead-of-time reports and on time sessions in prospect, a good convention is assured.

The Day's Work— Is It Better or Worse?

A GOOD many people are fond of saying that the working man of today is worth far less than his predecessor of a generation ago. This statement is frequently coupled with a lament about high wages, and a gloomy prediction of national disaster because bricklayers are paid $14 a day.

One is reminded of the man who complained that "Times ain't what they used to be," and that tart rejoinder "No, and they never were," from the other man who realized that times as "they used to be" are often mere figments of the imagination. Is the better day's work of past times also a figment of the imagination?

Without touching at all on the complex question of wages, it would be interesting to know whether or not the modern working man really does less work in a given time, or work of a poorer quality, than his predecessors used to do. A number of railways incline to the belief now that the quantity and quality of work is much improved over the situation in the war period and is about as good as it ever was. Furthermore, thanks to labor-saving machinery in certain railway operations, more work is actually being accomplished per dollar of cost than was the case in the "good old days." So perhaps we should avoid generalizations about labor's inefficiency, for it appears that, at least in some cases, it is no longer justified.

The Proposed Broadside Investigation of Public Ownership in Europe

A PLAN for "attacking the European public ownership bugaboo" has been proposed by some energetic publicity men, as noted in the news columns in last week's issue. The plan is to organize a "public ownership research commission" from a group of the public relations utility men who expect to attend the world's advertising convention in London next year.

Irrespective of whether the information desired could best be secured in this way, it might be well to point out that not so many years ago a commission to study this same subject was sent to Europe by the National Civic Federation, and the results are embodied in an extensive report published by the Federation. The commission undertaking this study was made up of an equal number of representatives of those in this country in favor of and opposed to municipal ownership of utilities. Conditions cannot have changed so much since that report as greatly to vitiate its conclusions.

Incidentally, it might be said that the political conditions in Great Britain and Europe and in this country are so different that any prosperity which British municipal utilities may have attained is not necessarily an indication that municipal operation would be equally successful here.

Energy Consumption Reduced in St. Louis

Tests Made on United Railways of St. Louis Result in Installation of Meters on 1,420 Cars—Test Procedure and Results Described—Education of Car Operators Is an Important Factor — Definite Factors Found for Traffic and Temperature Variation — Completed Installation Has Resulted in Peak Load as Well as Over-All Energy Reduction

By Benjamin F. Thomas, Jr.
Mechanical Engineer United Railways Company of St. Louis

DURING the summer of 1922 tests were run on two lines of the United Railways Company of St. Louis, which showed that by the use of Economy watt-hour meters, with proper instruction of the motormen in the handling of their cars, a saving of better than 10 per cent in the energy used for car propulsion could be effected. In consequence the company ordered meters for its 1,420 motor passenger cars, and the installation was completed on March 1 of this year.

For the tests the Park line was selected. This combination east-and-west and crosstown route is considered a very hard line for the platform men, operating as it does through dense traffic downtown and carrying a high number of passengers per mile, while it is enough of a crosstown line to have many stops at the short blocks on all north-and-south streets.

The meters were installed during April. A "blind" test was started on April 26, after all of the cars had been turned in at the carhouse for the night, and was completed the night of May 3. A meeting of the motormen was held the following day, at which the purpose of the meters, the method of keeping records, and the way in which power could be saved were explained. The actual test began the next morning, May 5. The first day showed a saving of 8.5 per cent over the "blind" period. It increased day by day, the average reduction in energy for the first week of operation being 10.42 per cent. The second and third weeks did not quite equal this figure. During these first three weeks nothing whatever was said to any of the men except at the first meeting.

After this period an instructor was appointed to show the men how to operate more economically. The effect was felt at once, the saving in the fourth week being nearly 4 per cent higher than the preceding, and it rose gradually to 16.5 per cent. The saving then remained above 15 per cent until Oct. 1.

The results are shown graphically in Fig. 1, while Fig. 2 gives the energy taken per car-mile for cars of the same type and weight, but equipped with different motors. An exception is made of the cars pulling trailers, which are of a different type and weigh about 2,000 lb. more. This curve shows the effect of motor equipment on energy consumption.

TABLE I—BLIND AND STANDARD ENERGY CONSUMPTION, DIVISIONS 4 AND 7

Standard Kilowatt-Hours for Each Round Trip

			Adjusted Kilowatt-hours per Car-Mile		Car Series			
Route	Standard Car Series	Round Trip, Miles	Blind	Standard	Trains	1,100 2,200	1,700 to 2,100	500 700
Broadway....	*	28.93	3.056	2.75	154	85	75	..
Lee..........	2,100	20.68	3.501	3.15	119	..	65	..
Bellefontaine.	1,800	30.33	2.971	2.67	165	79	79	..
Sarah........	2,100	9.43	3.064	2.75	...	..	26	..
Grand.......	700	13.66	2.935	2.64	62	..	..	35
Belt..........	2,000	8.15	3.199	2.88	46	29	23	..
Jefferson Barracks...	500	5.37	1.132	1.02	...	..	..	5

*All single cars.

A check test was run upon the Jefferson line, a heavy crosstown route. The energy saving on this line rose gradually to 13 per cent. Based upon the results of the two tests, it was thought that the saving over the entire system would be not less than 10 per cent at the cars, and, since a saving of this magnitude would effect a big reduction in the power bill, the installation of the meters was considered economically desirable.

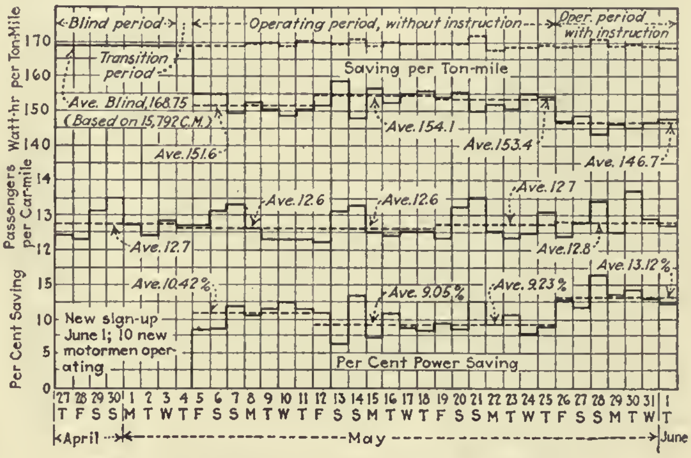


Fig. 1—Results of Power-Saving Test, Park Line

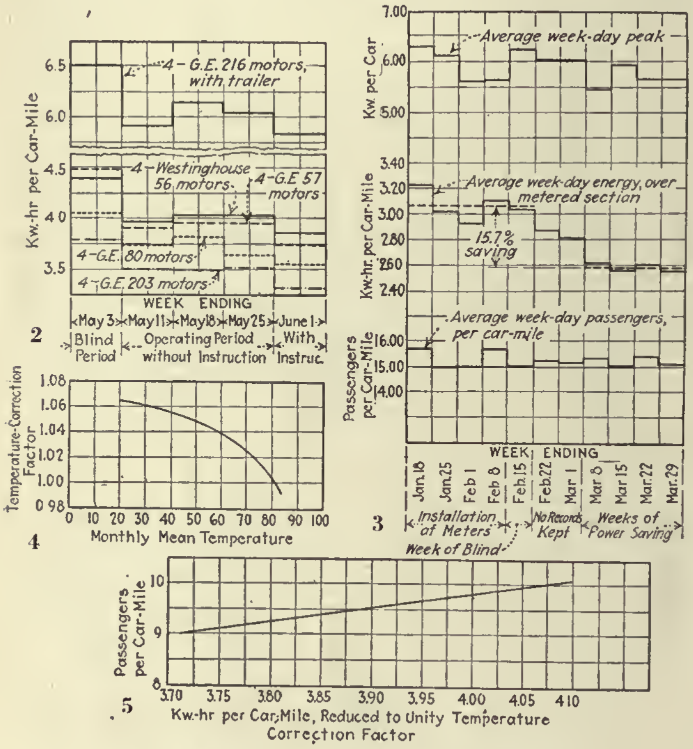
THE BLIND TEST

Each meter, when it was installed on a car, had a black paper mask concealing the dial. When all the cars at one shed had been equipped with meters, a "blind" test was run for one week, the meters being opened and read in one night by men from the office, the readings being repeated one week later. At the second reading the masks were removed. The mileage made by each car during this period was kept, so that from this and the energy readings the kilowatt-hours per car-mile were computed. The figures were tabulated and averaged for each line and type of car to show how much energy the men were using prior to the power-saving campaign.

Adjustment factors for the various types of cars also were determined from these readings. On some lines two or four series of cars may be used that differ in weight and motor equipment. One type was selected as standard for each line and the kilowatt-hours used by other types adjusted to the same basis. As a simple example, the two-car train uses twice the energy taken by the light-weight Peter Witt car, so the adjustment factor for the trains on that line is 0.5. A similar adjustment was made for every line to reduce the readings on each type of car to the same basis as the kilowatt-hours per car-mile for the standard car selected for that line. A "standard" also was worked out for each series of cars on every line in kilowatt-hours per round trip, by reducing the blind for each series by 10 per cent and then multiplying by the round-trip mileage. Table I shows these data for two divisions.

No attempt was made to adjust the blind for each line for variations in the temperature and number of passengers, because it was thought best to have a fixed amount for the men to work against. This causes the indicated saving to appear a little higher or lower than the actual, but the per cent of saving shown on any line is only to keep up the interest of the men, the real saving being calculated at the switchboard.

As a check upon the blind figure, watt-hour meters were installed in the substations upon certain feeder sections of a few lines. These meters were read daily at 3 a.m. and at the beginning and end of the peak hour. Curves were drawn showing the kilowatt-hours per car-mile, and the kilowatts per car during the peak. The curve for the Grand line is shown in Fig. 3. The saving is 15.7 per cent, which compares favorably with that of 15.3 per cent computed from the motormen's cards. Table II shows the results of these metering tests.



Charts Made for Getting Correction Factors

Fig. 2—Comparison of energy consumption by classes of equipment, Park line.
Fig. 3—Peak load and energy consumption on Grand line feeder.
Fig. 4—Temperature correction factor for energy per car-mile.
Fig. 5—Relation between passenger travel and energy consumption.

A few days after the blind test was completed, two meetings of instruction were held at each shed, one in the afternoon and one in the evening. All motormen and conductors had to attend. At these meetings were explained the purpose of the meters, the ways in which it is possible to save energy, how to fill out the meter cards properly and how the records are kept.

Each motorman fills out a separate card for each car he operates, giving the information from which the mileage can be determined. The cards, which are of the type now generally used for this work, contain spaces for the following:

Motorman's name and badge number; date; car number; line; run number; time, place and meter reading when taking the car; time, place and meter reading when leaving the car; deviations from the regular schedule.

A place for subtraction of meter readings and the calculation of the mileage is left for office use. The men are instructed to note on their cards any and all trouble with their cars, or any occurrence beyond their control that might require the use of more energy than normal.

At the end of his day's work, the motorman turns in to the station clerk his card, properly filled out, and it is sent to the main office the next morning. There the computations are made, after which the cards are filed by the motormen's names and badge numbers with individual index cards. Twice each month these cards for each man are totaled and the kilowatt-hours and car-miles entered on the index cards, which are then sorted in order of standing, the man using the least energy per car-mile being first, etc.

A summarized list is made for each line, showing the standing of each man, his average energy consumption for the last period and the preceding one, and the saving for the entire line. This list is posted on the carhouse bulletin board, copies being kept by the office, the power saving instructor and the division superintendent. The power saving instructors, of whom there are two, ride on the cars with the men far down on the list and instruct them to operate their cars more efficiently. Their value was demonstrated during the tests on the Park and Jefferson lines.

AMOUNT OF SAVING AT THE SWITCHBOARD

The energy saving computed from the motormen's records is that at the cars. To it must be added the reduction in distribution losses between the substations and the cars. It is at the switchboard that the saving really means money, so that it is essential that it be computed for this point as accurately as possible. For this purpose power statistics were plotted for the past seven years, and from them it was possible to extrapolate the curves for each month after the campaign started to show the amount of power and energy that would have been used under present-day conditions had the meters not been installed.

The first step was to determine the variation in energy per car-mile due to the weather. July was taken as the basic month because the lowest energy consumption per car-mile usually was obtained during this month. The energy consumption in kilowatt-hours per car-mile for each month was divided by that for July of the same year. This ratio was called the "temperature correction factor," and was compared month by month for all years under consideration. A similarity was noted for the corresponding months of each year. This factor was plotted against the mean temperature for the month and this resulted in the very smooth curve shown in Fig. 4. As the temperature decreases the power consumption increases, due to higher friction, unfavorable rail conditions, higher winds causing greater side pressures, slower operation due to snow, sleet, etc. From this curve can be obtained for any month the proper temperature correction factor to reduce all power figures to a comparable basis.

The next step was the determination of the relation between energy consumption and passengers carried. The figures for passengers per mile were plotted against the kilowatt-hours per car-mile by months for each year and then for a number of years together. These curves showed nearly a one to one ratio, which at first seemed entirely too high, as generally this relation is considered to be about three to one. However, this ratio was confirmed by the plots, and the result is shown in Fig. 5. The actual ratio as determined on this curve is 1.2 to 1. All the data had previously been corrected for temperature.

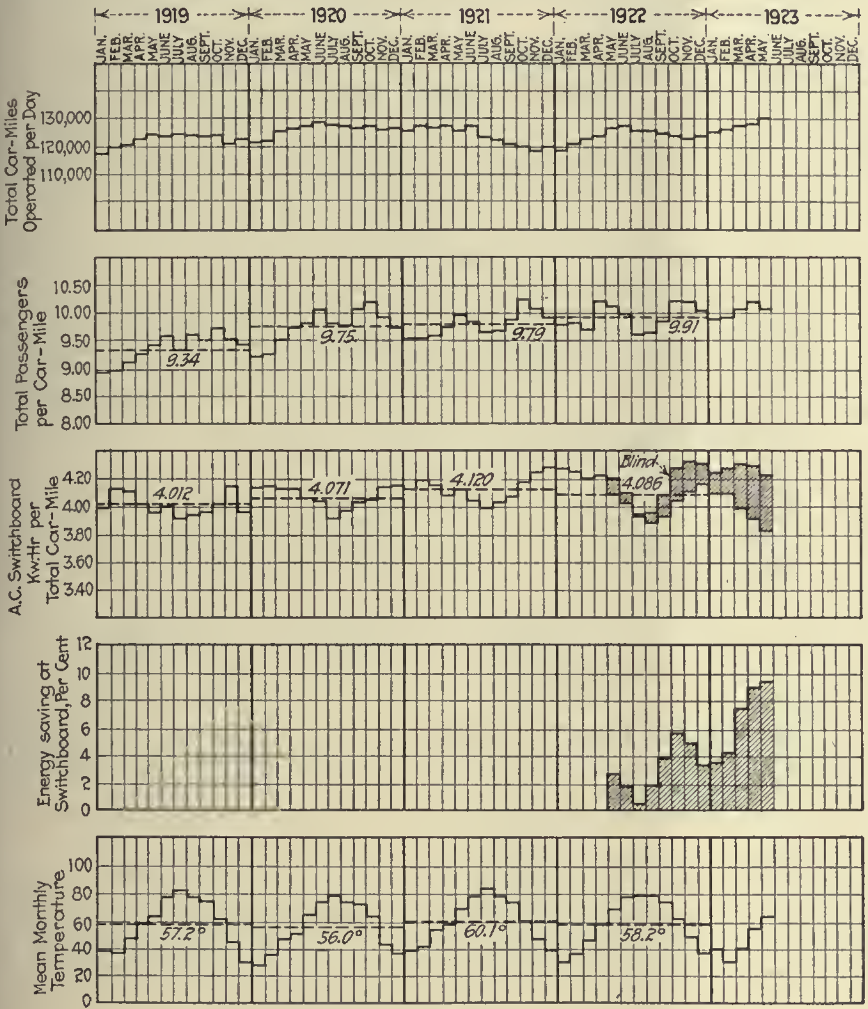
The next thing done was to figure a "blind" of energy consumption per car-mile. Power saving in St. Louis started in May, 1922, and a slight though indeterminate effect was felt over the whole system shortly after. In order to have no effect of this power saving in the blind figure, the data for the twelve months preceding May 1, 1922, were used. The actual kilowatt-hours per car-mile was determined for each of these twelve months and adjusted for temperature and to a basis of ten passengers per car-mile. The resulting figure was 4.06 kw.-hr. per car-mile at 81 deg. F., about an average for the month of July, and with ten passengers per car-mile. From this base the blind for any month can be calculated from the formula:

$$\text{Blind} = T \times 0.01 \left(100 \pm \frac{P}{1.2}\right),$$

where T is the temperature correction factor, and P is the per cent change in passengers per car-mile from the standard of 10. For example, the temperature for May, 1923, was 64.1 deg. F., and 10.04 passengers per car-mile were carried. From the curve the temperature correction factor is 1.033, and the passengers 0.4 per cent above 10. The blind for May is then

$$4.06 \times 1.033 \times 0.01 \left(100 + \frac{0.4}{1.2}\right) = 4.21$$

The actual kilowatt-hours per car-mile for May was 3.82, showing a saving of 0.39 kw.-hr. per car-mile, or 9.26 per cent.



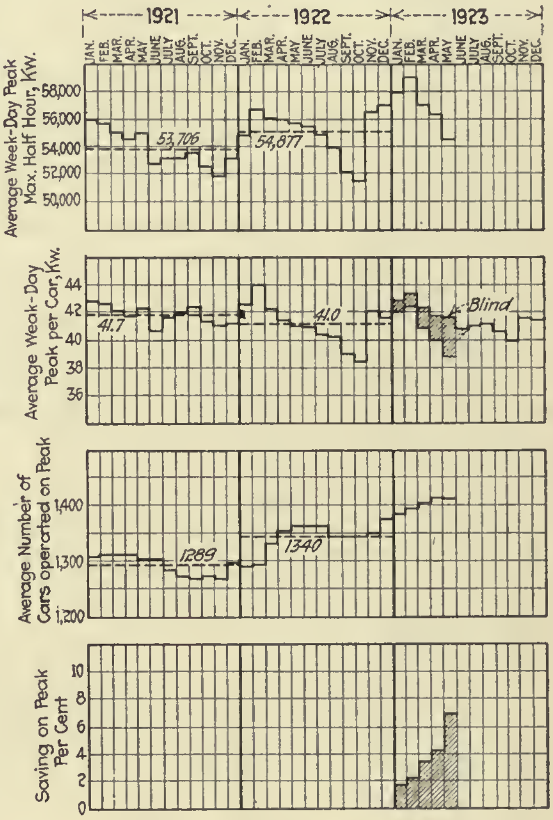


Fig. 6—Power Demand and Energy Consumption, 1919-1923. Fig. 7—Reduction in Peak-Hour Demand

The figure used for the blind, 4.06, was calculated by three separate methods and all checked within 1 per cent, so that it can be considered representative. This figure is calculated at the a.c. switchboard. The mileage figures used include all cars, passenger-motor and trailer, work cars, cars to and from shops, chartered cars and the car-miles of the Missouri Electric Company, a subsidiary. No deductions are made from the total energy used, so that it includes all energy for lights, shops and miscellaneous uses. Fig. 6 shows the power statistics plotted for five years, showing the important factors bearing upon the energy consumption.

POWER DEMAND IS REDUCED AT THE PEAK

The demand charge for power at the peak being a large per cent of the total cost, the reduction of power demand is a matter of much concern with this company. On account of this charge the monetary saving is not directly proportional to the reduction in energy. That there can be a saving on the peak as well as for the twenty-four-hour average it is reasonable to as-

TABLE II—RESULTS OF METERING CERTAIN SECTIONS OF THE LINES

	Blind Period			Energy-Saving Period		
Line	Number of Weeks	Kw.-Hr. per Car-Mile	Passengers per Car-Mile	Number of Weeks	Kw.-Hr. per Car-Mile	Passengers per Car-Mile
Olive	4	3.51	11.83	5	3.28	11.09
Broadway	3	3.27	8.61	5	2.95	8.53
Grand	5	3.06	15.25	4	2.58	15.20
Jefferson	1	3.62	15.26	7	3.32	15.21

	Energy Saving,		Per Cent	Power Saving on Peak, Kilowatts per Car		
Line	Gross	Adjusted for Decrease in Passengers	from Motormen's Records	Blind Period	Power Saving Period	Per Cent
Olive	6.55	1.34	9.56	12.73	12.04	5.42
Broadway	9.79	9.17	8.73	12.65	12.08	4.50
Grand	15.69	15.35	15.26	5.97	5.68	4.86
Jefferson	8.29	8.01	11.89	4.50	4.19	6.89

sume, because a car can be operated economically during the peak as well as at other times. More energy will, of course, be used, and if compared with the average blind, a smaller saving will be shown. Were the blind obtained just for the peak hour, the present use would show almost as great a saving as when the all-day figures are used. The only objection to this reasoning is that the motormen, knowing it is harder to operate economically, make less effort so to do. On the Park line an effort was made during the test period to determine the saving on the peak, by comparing the saving effected by the trains with that for all cars throughout the day. The trains operated only during the morning and evening peaks and in a three-week average showed a saving of 8 per cent as compared with the over-all saving of 9.6 per cent.

A further check was tried by metering certain feeder sections on a few lines. These figures, given in Table II, showed a decrease in the energy used during the maximum hour varying from 4.5 per cent to 6.9 per cent, but only a limited amount of reliance can be placed upon them because of their being obtained by subtracting meter readings differing by a very small amount.

To show the effect on the system peak, the data for 1921, 1922 and 1923 have been plotted in Fig. 7. For May, 1923, the saving in power is shown as 6.8 per cent, while the energy saving for this same month was 9.3 per cent. at the a.c. switchboard. As the men become better instructed it can be expected that this peak saving will rise more rapidly than the all-day energy saving, because it is in this period that they need instruction the most.

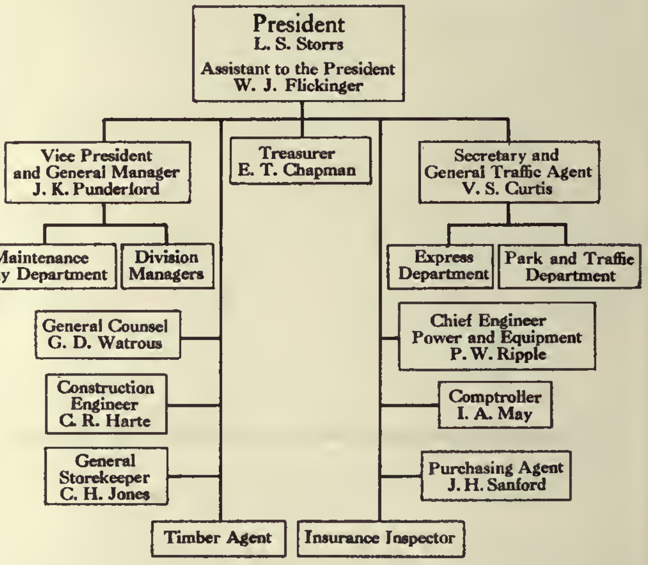
The installation of watt-hour meters on all the cars of this system is, I believe, economically a success. Besides the actual saving in energy there is a reduction in brakeshoe and wheel wear, variously estimated up to 25 per cent, and a decreased maintenance of the electrical equipment.

There is a tendency for the motormen to exaggerate the difficulties of power saving, but this can be overcome by proper instruction. Great savings can be made if a follow-up system is faithfully carried out. By this is meant the prompt, regular and accurate posting of the lists for each line at the stated times; the proper instruction by men not only capable of operating a car very well but able to instruct others, and the proper attitude and backing of the management and the transportation department. It is a combination of all these conditions that has made power saving a success in St. Louis.

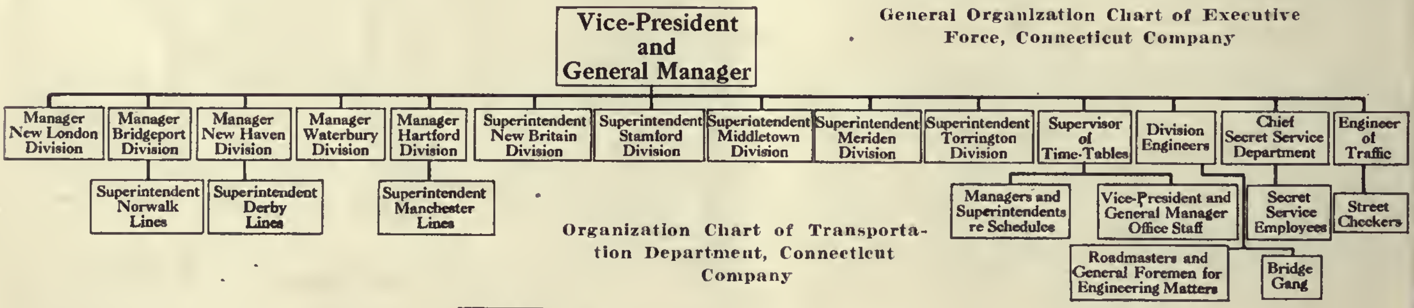
Extensive Use of Charts

All Essential Data Are Recorded Graphically for Quick Reference—Connecticut Company Finds Them Very Useful in All Departments

SEVERAL articles have recently appeared in this paper describing the use of graphs by the power and equipment department of the Connecticut Company for tabulating various data needed in that department. The use of graphs and charts, however, is not confined to the power and equipment department of the company. They are used extensively by all departments of the



General Organization Chart of Executive Force, Connecticut Company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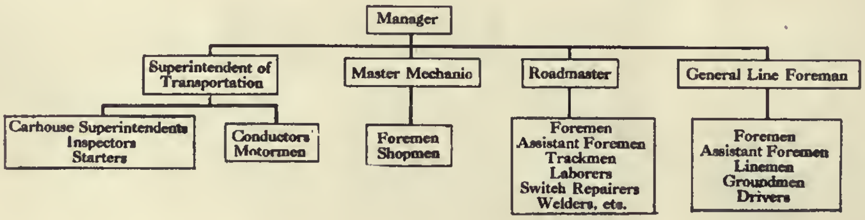
Superintendent Norwalk Lines
Superintendent Derby Lines
Superintendent Manchester Lines
Managers and Superintendents re Schedules
Vice-President and General Manager Office Staff
Secret Service Employees
Street Checkers
Roadmasters and General Foremen for Engineering Matters
Bridge Gang

Organization Chart of Transportation Department, Connecticut Company



At Left, Organization Chart for Maintenance Forces, Connecticut Company

company and have been found most useful as a method of tabulating information and keeping it up to date. This makes the figures instantly available in a handy form, and permits of comparisons more readily than when pages of figures must be analyzed. The amount of information that can be put on a single sheet also is considerably more than can be given in figures.

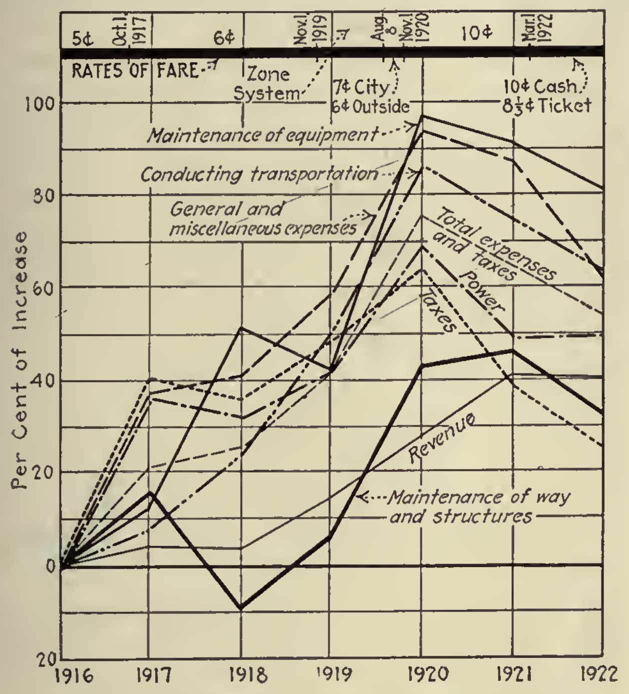
CHARTS COMPILED FOR COMPANY EXECUTIVES

Charts are also used for outlining the organization of the company, as shown in the two charts reproduced herewith, one giving the general organization and one the detailed organization of the transportation department, under the direction of the vice-president and general manager.

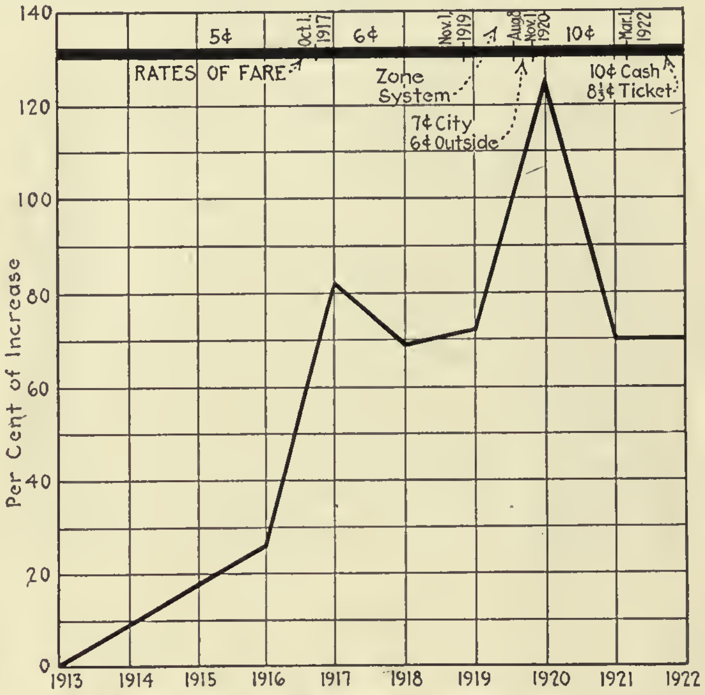
Four other charts are reproduced as typical of those compiled for the executives, and particularly for the transportation department. A feature of these charts is that the rates of fare for the various periods covered are indicated at the top of each chart.

These charts show respectively the percentage for each year; the percentage increase in operating costs over 1916; the percentage increase in cost of materials over 1913, as based on the principal material purchased by the company; the percentage increase in revenue and operating costs over 1916, and the amounts expended for payrolls and per cent of increase over the year 1916.

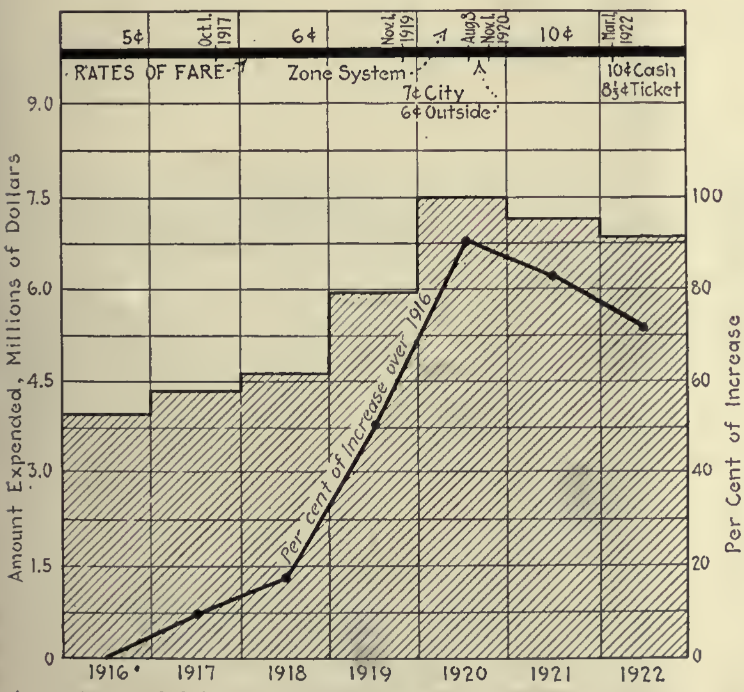
These charts are kept up to date under the direction of the construction engineer and copies are supplied to the various heads of departments and others interested. It gives them the facts, and these are often very useful in any question which may come up on the increased cost of operation in recent years.



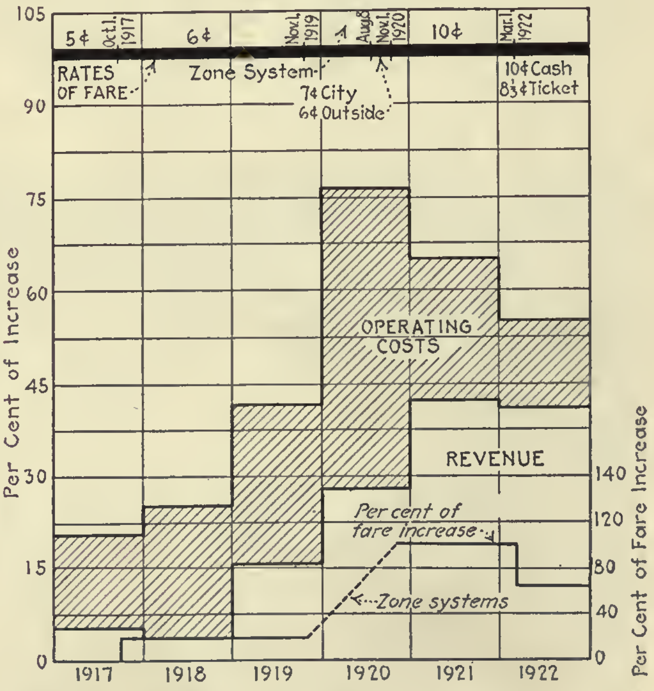
Per cent of increase in operating costs over 1916



Per cent of increase in cost of materials over 1913



Amount expended for payrolls and per cent of increase over 1916



Per cent of increase in revenue and operating costs over 1916

Typical Graphs of General Data Kept Up to Date by the Connecticut Company

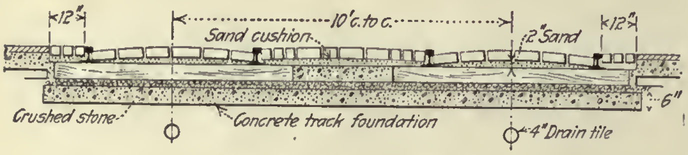
Derrick Removing the Old Rails and Ties Which Will Be Used Again for New Trackwork

Railway Does Better Paving than City

Replacement of Single Track by Double Track in Ft. Wayne Involves Novel Features of Removal and Reconstruction

OPPORTUNITY was afforded the Indiana Service Corporation to observe the effects of time and traffic on its standard paved track construction when it recently became necessary to replace the single-track line on South Calhoun Street, Fort Wayne, with a double-track line. While the surface of the pavement between the rails remained in perfect condition and served to indicate that the construction underneath had not broken down, the tearing up of the track verified the supposition.

The track construction, as is illustrated in the accompanying drawing, is of the wood tie type with a sub-slab of concrete and brick paving separated from the tie by a cushion of sand. Crushed-stone ballast is provided between the ties and the concrete slab, while a concrete mixture is used between the ties. Sawed cedar ties, 6 in. x 8 in. x 7 ft. long, placed at 24-in. centers, are used under the 7-in. 91-lb. plain girder rail. A 4-in. drain tile is placed under each track wherever needed.



Detail of Track Construction

In the double tracking of this particular stretch of Calhoun Street it was, of course, necessary to remove the pavement on each side of the single track and extend the single-track concrete slab to two-track width. As is shown in an accompanying photograph, a derrick was used to remove the single-track ties and concrete between the ties. A temporary track was laid along one side of the street in order that service might be maintained during the reconstruction period. The rails of the old single-track lines will be moved over and used for one track of the new double-track line. After nine years of service, the ties were still in such excellent condition that they also will be used in the new track construction.

Some idea of the service this particular stretch of track has given may be obtained from the following:

Total interurban cars (two daily freight, twenty-four daily passenger), at 35 tons each	910 tons
Total city cars, 534 daily at 10 tons each	5,340 tons
Total weight	6,250 tons daily
Average weight per wheel	2.7 tons
Number wheels per joint	586 per day
Total tons per joint	1,582.8 per day

Left—Brick Paving Is Laid on a Sand Cushion. Right—Adjoining Pavement Has Worn Less Well than that Laid by Railway

Although the track was not designed for the heavy vehicular traffic coming in and out of the city, which amounts to about 4,000 automobiles and trucks per day, it has stood up well under these conditions. Some comparison between the pavement laid by the railway and that adjoining it may be obtained from an accompanying illustration, which shows one of many holes at the side. Both pavements were laid at the same time. Although the original construction of the track employed cast-weld joints which have stood up well under the service, all new construction is being made with Thermit weld process.

The total cost of such construction, including the temporary track for operation of the regular schedule during construction, amounted to $6.66 per foot in 1914, at the time that the original construction was made, and it would be $10.98 per foot if reconstructed today. During the nine years that this track has been in service no money has been spent upon it for maintenance or repairs whatsoever.

Modern Cars Double Net Revenue

A Year of Operation of 12½-Ton One-Man Interurban Cars by the Kentucky Traction & Terminal Company Demonstrates Their Economy and Merchandising Ability—They Early and Apparently Permanently Eliminated Destructive Bus Competition

LEXINGTON, KY., is the center of the interurban railway system of the Kentucky Traction & Terminal Company, radiating to Frankfort, Georgetown, Paris and Nicholasville. See map on page 210 of the Aug. 11 issue. The interurban business of the company is about equal to that which it does in Lexington, the only city in which it furnishes local service on a considerable scale.

Previous to February, 1922, the company operated, on the interurban lines, ten cars weighing about 38 tons each. These cars were known to be too heavy, and both the railway and the railroad commission were planning for improvement in operating conditions when the matter was brought to a head by the development of bus competition which threatened to absorb all the business. On one line the buses got as high as 60 per cent of the traffic. Radical action was necessary.

Study of what had been done elsewhere and conference with manufacturers indicated that a one-man car could be designed to weigh only about a third of the weight of the heavy cars, and ten of these cars were ordered. The number has since been increased to twelve.

These interurban cars, of which the details were given in the issues of this paper for April 29, 1922, page 736; June 3, 1922, page 893, and Oct. 7, 1922, page 561, weigh completely equipped 25,100 lb. They are equipped with four GE-264 motors, 26-in. steel wheels and K-35 control. They were designed with a view to attractiveness and comfort as well as lightness, and were put into service on a headway reduced one-third, i.e., from one and one-half hours to one hour. Just previous to the date when the new cars went into commission a reduced fare was put into effect, and special concessions were made to induce patrons to purchase tickets. These features were well advertised in advance.

The result of the inauguration of the new service was almost immediately to eliminate bus competition. The new cars reduced the power consumption by 50 per cent on the interurban lines and 15 per cent on the city and interurban lines together. The maximum demand on the power house was reduced about 600 kw. The energy consumption per car-mile on the interurban cars was reduced from 4.8 kw.-hr. to 2.3 kw.-hr. Various other savings were evident from the start.

The 25,100-Lb. Interurban Car Which Has Brought Results in Kentucky

The cars have now been in use more than a year, so that it is possible to give comparative results over a period long enough to show the accuracy or otherwise of the first estimates. The over-all results of the reduction in weight of the cars used on the interurban lines, the operation of these cars by one man, the improvement in service with consequent elimination of competition, together with minor economies, are as follows: First and most important, the net revenue, or difference between gross revenue and operating expense, for the fiscal year ended March 31, 1923, as compared with the preceding year, increased 102.4 per cent. This is the composite result of a 12.7 per cent increase in operating revenues and a 13.2 per cent decrease in operating expenses.

WHERE THE SAVINGS WERE MADE

The principal savings in operating expenses were in the following items: (1) Power cost, which, due to an 18.1 per cent reduction in total energy consumption, decreased 16 per cent, in spite of a large increase in the price of coal, the kilowatt-hours per car-mile being 40.7 per cent less and per car-hour 40.4 per cent less; (2) equipment maintenance, 35.8 per cent; (3) track maintenance, 34.3 per cent.

The car-miles were 38.4 per cent, and the car-hours 37.4 per cent greater, so that the cost of conducting transportation was not greatly reduced. It actually was 7 per cent less. The number of passengers per car-mile was 5.2 per cent and the revenue per car-mile 18.6 per cent less, but much more than offsetting this was a reduction in expense of 37 per cent. The schedule speed of the cars remained about the same, i.e., 19.9 m.p.h. as compared with 19.7 m.p.h.

There were also certain operating savings which were beneficial in several directions. For example, the number of late trains was reduced 64.2 per cent, and the time thus lost 53.1 per cent. The number of cars put out to replace bad-order cars was 30.7 per cent less, and the corresponding cost 53 per cent less. Although less definite as to connection with the operation of the new cars, the fact that 58.8 per cent fewer ties had to be replaced is an indication of track maintenance savings. Tie replacements were made with an increased spacing; instead of being on 2-ft. centers, the new ties are spaced from 2 ft. 6 in. with 60-lb. rail to 2 ft. 9 in. with 70-lb. and 3 ft. with 80-lb. rail.

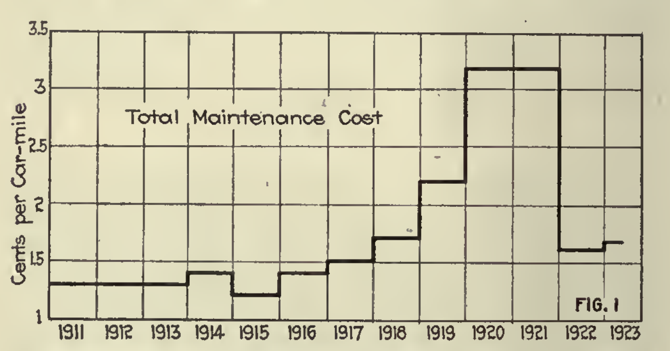
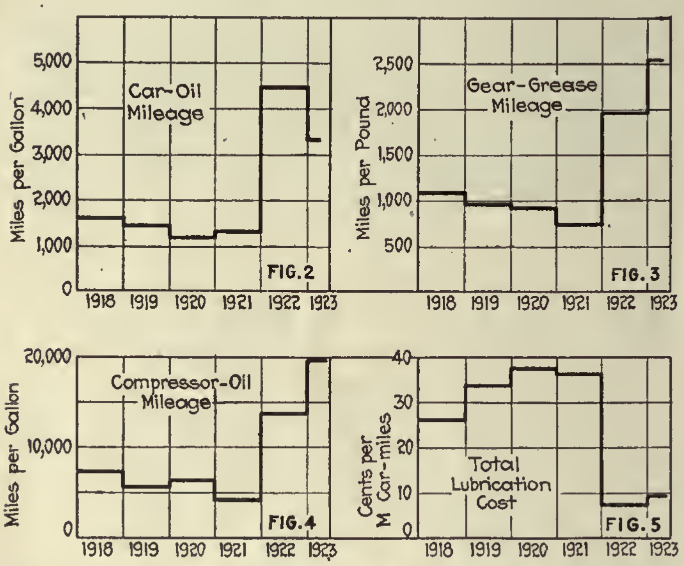


Fig. 1—Interurban Car Maintenance Costs, Kentucky Traction & Terminal Company



Figs. 2 to 5—Lubrication Data for Interurban Cars

Reference was made earlier to the fare situation on the interurban lines. For comparison with the present fares it will be of interest to note that the fare has been modified from time to time as follows: Prior to June 6, 1914, it was 2 cents per mile, but was increased on that date to 2½ cents, except that a mileage-book rate of 2 cents was retained. Four years later both cash and mileage rates were raised to 3 cents, and on Aug. 26, 1920, they went to 3.6 cents, the standard steam railroad rate throughout the country. This was the maximum. On Dec. 1, 1921, the cash fare came down to the present rate, 3.25 cents, and the mileage rate to 3 cents. The following table shows the relative numbers of passengers paying cash, purchasing tickets and using mileage books:

PERCENTAGE OF TOTAL PASSENGERS

Year	Paying Cash	Purchasing Tickets	Using Mileage Books
1914	85.1	6.4	8.5
1915	76.7	10.3	13.0
1916	77.1	12.7	10.2
1917	77.0	12.2	10.8
1918	73.6	17.3	9.1
1919	86.3	10.8	2.9
1920	85.7	12.0	2.3
1921	85.7	11.8	2.5
1922	63.5	36.0	0.5
1923	51.5	48.5	—

It is early yet to draw definite conclusions on the maintenance costs of the new cars as compared with the old. The company has not kept records separately for the interurban cars. From the year 1912 to February, 1922, when the light-weight cars replaced the heavy interurban cars, the maintenance records cover six double-truck interurban cars weighing 72,800 lb. each and nine averaging 52,750 lb.; twenty-seven single-truck city cars weighing 26,350 lb. each and twelve averaging 19,000 lb. each; four freight cars weighing from 40,000 lb. to 70,000 lb.; and two work cars weighing 35,500 lb. each. In February, 1922, delivery on the ten new light-weight cars was begun and in March all the old interurban cars had been replaced, except for extra runs.

The effect of substituting the new cars is shown in Fig. 1. The total cost of car maintenance per car-mile has been reduced materially, and it now is not far from the cost of maintaining the heavy cars ten years ago. The figure for April was 1.3 cents per car-mile. The lubrication results as shown in Figs. 2 to 5 are as would be expected.

SHOP COST AND OTHER DATA FOR TEN CARS OF THE NEW TYPE

It will be of interest to note some facts regarding the new interurban cars from Feb. 1, 1922, to date, although of course the maintenance costs on these cars have not as yet settled down to a steady value. During the eleven months the ten cars made 945,374 miles. The average of car-miles per month was then 67,526, or 6,752 per car per month. This gives an average of more than 225 miles per car per day.

During the period twenty-four sets of wheels were changed for turning, these wheels having made a mileage of 1,878,279. The average mileage per set of wheels changed was, therefore, 78,279.

As to power consumption the average kilowatt-hours per car-mile can be estimated at 1.34. This was determined from actual energy measurements on one car from May to December, 1922, inclusive. During this time the car made 47,498 car-miles, and consumed 63,837 kw.-hr.

In ordinary routine maintenance on the cars, the expenditure was $2,655 for labor, and $1,005 for material, a total of $3,660. This is an average of 0.387 cent per car-mile.

Eight of the cars were overhauled at a cost of $788 for labor, and $169 for material, a total of $957. This is 0.1 cent per car-mile, calculating from the mileage made by ten cars. The overhauling included painting the eight cars at a cost of $658 for labor and $135 for material, a total of $793, or, more exactly, $99.14 per car.

Freight Accounting on the North Shore

By Sectionalizing of Agents' Accounts and Proving to a Known Total, a Complete Daily Check Is Obtained—An Illustration Shows Methods of Accumulating Totals

By T. B. MacRae
General Auditor Chicago, North Shore & Milwaukee Railroad

WHILE the foundation of the system of daily freight accounts in use on the Chicago, North Shore & Milwaukee Railroad rests on the two general principles of sectionalizing the agents' accounts and proving to a known total, it differs in the method of accumulating totals and in handling the "prepaid received" through the agents' cash books. So far as the writer knows, these two methods are not in use on any other road.

The North Shore line, in its freight department, does principally a merchandise dispatch business, which is akin to that of the American Railway Express, with the absence of pick-up and delivery, but which in its accounting features is similar to the handling of freight on a steam road. The term "freight" used in this article should be understood simply as a convenient term for reference.

On the daily balance reports, no provision is made for ticket accounting, as our freight agents do not handle tickets. Should it be desirable, on some other road, to do this, it would be necessary to provide proper accounts on this and other record forms, so that one report could cover both.

The receiving agent is held solely responsible for the correctness of every item that appears on the waybill. He is required to correct any error that may be discovered in weight, rates, extensions or footings. No correction is sent to the local forwarding agent. The receiving agent, however, is not permitted to change any amount that appears in the "Prepaid" or "Advance Charges" columns of such a waybill, corrections affecting either being made by "P.P.O." (prepaid only) waybill issued either by the receiving or forwarding agent, as the correction may require. On the waybills, the corrections are made by the auditor after the "received abstract" and original waybills have been sent to him. Such corrections may be made by the agent and sent to the auditor for acceptance, but generally they are issued direct from the auditor's office.

STANDARD FORMS ADOPTED

The standard forms recommended by the (steam) Railway Accounting Officers' Association were adopted for our "Received Abstract" and "Forwarded Abstract," with certain changes to conform to our local and accounting requirements. These forms are uniform in size. We purchase them blocked in pads, as we have found this more satisfactory to the agents than loose leaves. Both the agent's and auditor's copy are filed temporarily in loose-leaf binders, later being bound permanently by McBee binders.

The "Received Abstract" (form 271) is white in color, and is made out in duplicate by the agent. The column at the right, on the auditor's copy, headed "Company Material," is for the auditor's use only, the same column on the agent's copy being headed "Date Paid." On this form are entered all waybills in station and numerical order. Each sheet is footed separately, the totals being recapitulated on the last sheet and a grand total made. Debit corrections on waybills are added to, and credit corrections deducted from, such final totals. In all cases, corrections on waybills are handled by entering the correct amount in black ink and the amount which was corrected in red ink. The red ink figures take out of the agents' accounts automatically the amount originally charged, and the black ink figures include the correct amount. The records then will show the correct amount paid by the consignee without reference to corrections. The accumulated totals thus will always add to the amount to which they would have footed had the error not been made. Clerical errors in the abstract that are discovered and corrected by the auditor are adjusted by the agent, by changing the abstract and handling the error through the last accumulated totals. This may be done if several days have elapsed.

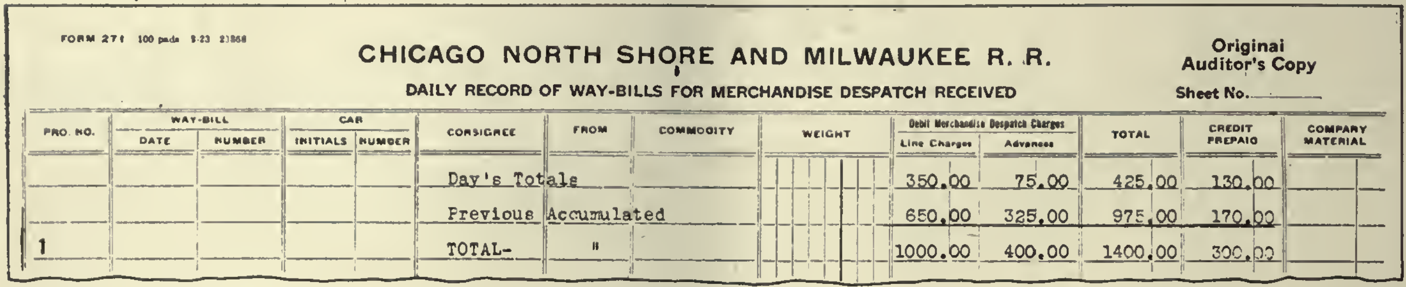
Agents must take a "Debit Waybill" correction into account within a day or two after its receipt, or else return it to the auditor with reasons for non-acceptance. The original freight bill must be returned with the correction, when taken into account, or a waiver must be secured from the consignee, on the correction sheet, if a freight bill has been paid and the original cannot be secured. If the freight bill has not been paid, agents are permitted to take a credit correction into account, returning the original freight bill with the correction. A "Credit Correction" cannot be taken into account, if the freight bill has been paid, until a refund is made, the original freight bill taken up or the waiver secured. If the refund cannot be made, the "Credit Correction" must be returned to the auditor with a full explanation, such corrections being handled through the general books without reference to the agent's account. All corrections accepted are attached to the original waybills in the auditor's office. In case an agent returns a credit correction, due to the inability to make a refund, proper notation is made on the original waybill to adjusting entry.

Interline waybills are abstracted in a similar manner, and the totals, after waybill corrections are handled, are carried to a summary sheet, and the final total for the day established.

The totals for the period are accumulated on the agent's copy. On the first day of the month there is no accumulation, the totals for the first day being listed below the totals for the second day, and the accumulated total for the two days obtained. The totals for the third day are added, giving an accumulation which is continued day by day, until the end of the month.

"FORWARDED ABSTRACT"

The "Forwarded Abstract" (form 273) is pink, also being made out in duplicate by the agent. The auditor



FORM 271 100 pads 9-23 21868

CHICAGO NORTH SHORE AND MILWAUKEE R. R.

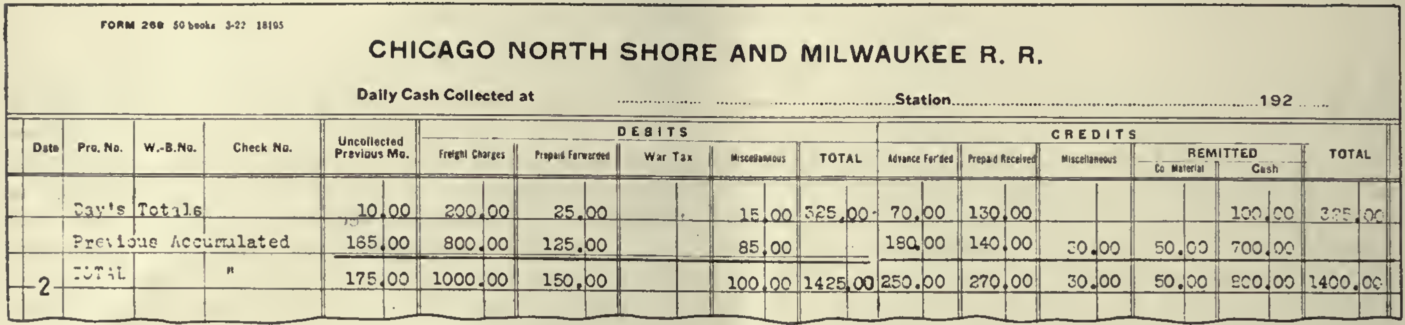
DAILY RECORD OF WAY-BILLS FOR MERCHANDISE DESPATCH RECEIVED

Original Auditor's Copy

Sheet No.______

PRO. NO.	WAY-BILL		CAR		CONSIGNEE	FROM	COMMODITY	WEIGHT	Debit Merchandise Despatch Charges		TOTAL	CREDIT PREPAID	COMPANY MATERIAL
	DATE	NUMBER	INITIALS	NUMBER					Line Charges	Advances			
					Day's Totals				350.00	75.00	425.00	130.00	
					Previous Accumulated				650.00	325.00	975.00	170.00	
					TOTAL-	"			1000.00	400.00	1400.00	300.00	

1



FORM 268 50 books 3-22 18105

CHICAGO NORTH SHORE AND MILWAUKEE R. R.

Daily Cash Collected at ....Station........................192....

Date	Pro. No.	W.-B.No.	Check No.	Uncollected Previous Mo.	DEBITS					CREDITS						TOTAL
					Freight Charges	Prepaid Forwarded	War Tax	Miscellaneous	TOTAL	Advance For'ded	Prepaid Received	Miscellaneous	REMITTED		
													Co Material	Cash	
	Day's Totals			10.00	200.00	25.00		15.00	325.00	70.00	130.00			100.00	325.00
	Previous Accumulated			165.00	800.00	125.00		85.00		180.00	140.00	30.00	50.00	700.00	
	TOTAL		"	175.00	1000.00	150.00		100.00	1425.00	250.00	270.00	30.00	50.00	800.00	1400.00

2

Most of the Forms Are Loose-Leaf

No. 1.—Received Abstract (white).

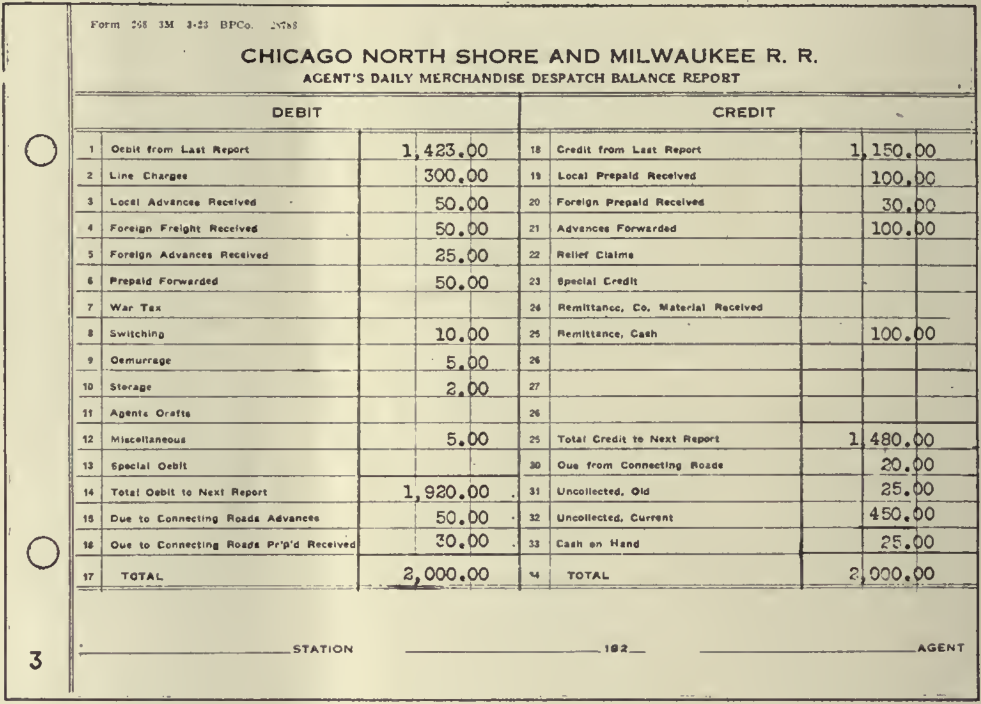
No. 2.—Agent's Cash Account (bound book).

Memo.—As day's debit totals cross-foot to $250, the difference between this sum and amount in total column, $325, or $75, must be cash at beginning. The difference between the sum of all debit and credit items of "previous accumulated" is likewise $75. As day's credit totals cross-foot to $300, cash on hand must be $25, which is also difference between "total accumulated" debits and credits.

No. 3.—Daily Balance Report (white).

No. 4.—Abstract of Miscellaneous Charges (buff).

No. 5—Forwarded Abstract (pink).



Form 268 3M 3-23 BPCo. 25788

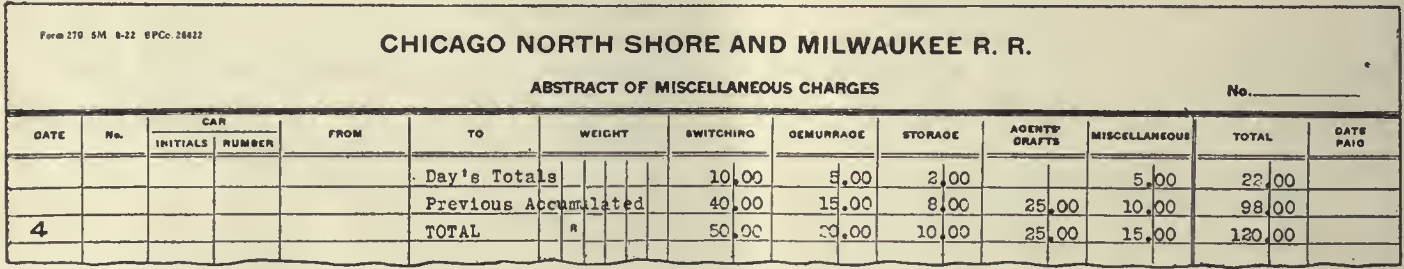
CHICAGO NORTH SHORE AND MILWAUKEE R. R.

AGENT'S DAILY MERCHANDISE DESPATCH BALANCE REPORT

DEBIT			CREDIT		
1	Debit from Last Report	1,423.00	18	Credit from Last Report	1,150.00
2	Line Charges	300.00	19	Local Prepaid Received	100.00
3	Local Advances Received	50.00	20	Foreign Prepaid Received	30.00
4	Foreign Freight Received	50.00	21	Advances Forwarded	100.00
5	Foreign Advances Received	25.00	22	Relief Claims	
6	Prepaid Forwarded	50.00	23	Special Credit	
7	War Tax		24	Remittance, Co. Material Received	
8	Switching	10.00	25	Remittance, Cash	100.00
9	Demurrage	5.00	26		
10	Storage	2.00	27		
11	Agents Drafts		28		
12	Miscellaneous	5.00	29	Total Credit to Next Report	1,480.00
13	Special Debit		30	Due from Connecting Roads	20.00
14	Total Debit to Next Report	1,920.00	31	Uncollected, Old	25.00
15	Due to Connecting Roads Advances	50.00	32	Uncollected, Current	450.00
16	Due to Connecting Roads Pr'p'd Received	30.00	33	Cash on Hand	25.00
17	TOTAL	2,000.00	34	TOTAL	2,000.00

______STATION ______192__ ______AGENT

3



Form 270 5M 8-22 BPCo. 26822

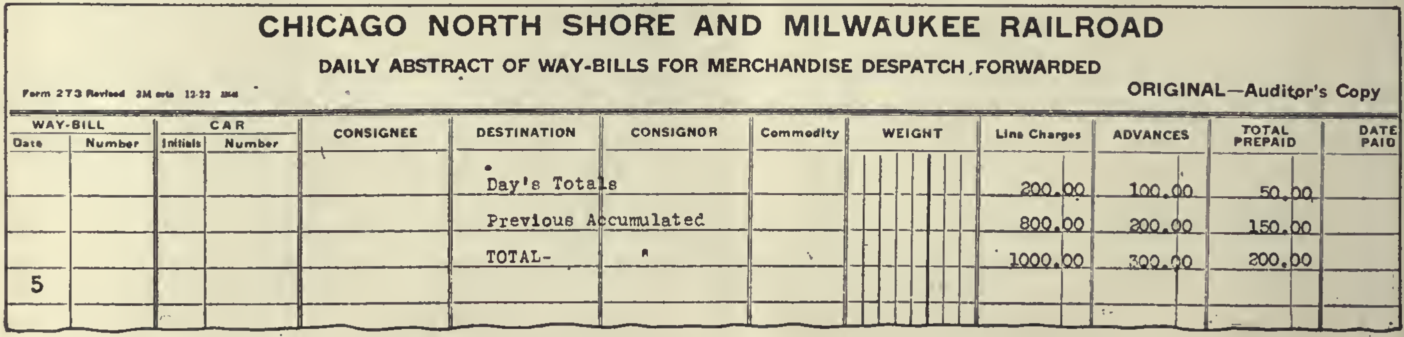
CHICAGO NORTH SHORE AND MILWAUKEE R. R.

ABSTRACT OF MISCELLANEOUS CHARGES

No.______

DATE	No.	CAR		FROM	TO	WEIGHT	SWITCHING	DEMURRAGE	STORAGE	AGENTS' DRAFTS	MISCELLANEOUS	TOTAL	DATE PAID
		INITIALS	NUMBER										
					Day's Totals		10.00	5.00	2.00		5.00	22.00	
					Previous Accumulated		40.00	15.00	8.00	25.00	10.00	98.00	
					TOTAL	"	50.00	20.00	10.00	25.00	15.00	120.00	

4



CHICAGO NORTH SHORE AND MILWAUKEE RAILROAD

DAILY ABSTRACT OF WAY-BILLS FOR MERCHANDISE DESPATCH FORWARDED

Form 273 Revised 3M sets 12-22

ORIGINAL—Auditor's Copy

WAY-BILL		CAR		CONSIGNEE	DESTINATION	CONSIGNOR	Commodity	WEIGHT	Line Charges	ADVANCES	TOTAL PREPAID	DATE PAID
Date	Number	Initials	Number									
					Day's Totals				200.00	100.00	50.00	
					Previous Accumulated				800.00	200.00	150.00	
					TOTAL-	"			1000.00	300.00	200.00	

5

uses the column "Date Paid" to stamp the date the waybill is reported by the receiving agent, or the month it is taken into the interline account. Waybills are abstracted in numerical order without regard to local or interline billing. The totals are recapitulated and accumulated, and clerical errors are corrected, in a manner similar to that already described for the "Received Abstract." No waybill corrections are issued for forwarded billing, but certain precautions are taken to prevent the agent from making the same error continually. The agent must send to the auditor receipts for "Prepaid Beyond" and "Advance Charges Paid." The forwarding agent is responsible for the amounts entered in the "Prepaid" and "Advance Charges" columns, the waybills being checked carefully in the auditor's office against such items. Any errors discovered are considered clerical errors. If in the "Prepaid" or "Advances Forwarded" columns, due to error in rates, etc., they are corrected by "P. P. O." waybills exchanged between the receiving and the forwarding agents.

If the forwarding agent discovers an undercharge in the total of a "Prepaid Beyond" waybill, he issues a P. P. O. without consulting the receiving agent. This is done in order to protect the connecting road as promptly as possible. If the agent of the connecting road files a claim with our junction agent for undercharge, he is permitted likewise to issue an "A. C. O." (advance charge only) waybill. This is practically the only use permitted of an "A. C. O."

The "Abstract of Miscellaneous Charges" (form 270) is slightly smaller than the two preceding forms, and is straw color. It is used to report all charges not provided for by the "received abstract" and the "forwarded abstract." Totals are accumulated and clerical errors are handled in a manner similar to that described. Waybill corrections are issued for switching and demurrage. The column "Date Paid" is not used in the auditor's office except for an occasional memorandum. In addition to the specific items called for on this report, agents are required to keep a station record on this form for "Special Debit."

At the close of the month's business the agent lists on the "Received Abstract" all items of every kind he has taken into account during the month and which remain unpaid as of the last day of the month. This statement becomes the agent's "Report of Uncollected" and it must be signed by the agent personally. No other form of monthly freight report is required. The agent makes the proper notation on abstract affected and his monthly accounts are closed. When the items listed on the abstract are paid later, they are stamped off on this form and not on the original record.

The "Daily Balance Report" (form 268) includes debits and credits provided for by daily abstracts and such additional items as enter into the agent's accounts. This is the small loose-leaf form, which is 9 in. x 6½ in. over all. "Special Debit" and "Special Credit" are unusual items charged or credited by the auditor. Credit is taken for "Relief Claims" when claims of this nature have been allowed. These three items are entered in the miscellaneous columns of the cash book the same day they appear on the balance report. Credit is taken on the report for freight charges on company material when the material is delivered and a receipt obtained on the freight bill. Such freight bills are forwarded to the auditor with the balance report. The "Total Prepaid" on a "Prepaid Beyond" waybill is carried as "Due to Connecting Road's Prepaid Received" until settlement is made. Against this the total debit of such a waybill is carried as "Due from Connecting Roads."

ACCOUNTS KEPT BY THE AUDITOR

The auditor keeps an account in his office with each agent on a loose-leaf ledger with twenty-two columns, covering debit items on "Balance Report" (form 268) numbers 2 to 13, and a total debit; credit items numbers 19 to 25, an additional column for cash in transit and a total credit. This form is ruled horizontally with thirty-four lines, one for each day of the month, a balance line at the top and one at the bottom, and a line for total footings. The items on the various abstracts are entered on this ledger after such abstracts have been verified. Debit item 13 and credit items 22 to 24 are not entered until their correctness has been established. Credit for cash remitted is made when the amount appears on the treasurer's report of cash received. When all the entries are posted the various columns are footed and cross-footed, totals of vertical columns being put in with a lead pencil. The total debit to the date on the ledger must agree with "Total Debit to Next Report," line 14 of the balance report. The same is true for the credit side.

The grand total of the various columns for all agents' accounts are recapitulated at the end of the month, and all figures are available for journal entry. Amounts covering interline accounts (debit items 4 and 5 and credit item 20) are transferred to a clearing account pending adjustment. The recapitulation of the totals of the various interline "Received Abstracts" must agree with items so transferred. "Prepaid Forwarded" is credited, and "Prepaid Received" is charged to a suspense account. "Prepaid Forwarded" on interline billing is charged to this account from interline abstracts received from the connecting roads. The balance of such account, when the books are closed, represents the sum of the prepaid on "Unreported Prepaid" waybills, both local and interline. This account is analyzed and balanced each month. "Advance Charges Forwarded" are handled in a similar manner.

The agent's cash account is kept in a bound book. 17 in. x 13 in. (form 269). In the column "Uncollected Previous Month" are entered all items shown on the abstract for the first day of the month as uncollected. In the column "Freight Charges" are entered items charged in the "Total" column of the "Received Abstract." The cash book must be balanced daily and ruled off. The account is opened by entering the cash on hand for the previous day in the "Total" debit column. Receipts and disbursements are entered in detail in the proper columns, and also in the total column, either in detail, or with totals only, as the agent may prefer. "Prepaid Received" items as given in the abstract are entered in detail in the column "Freight Charges" and contra entries in the column "Prepaid Received." We have found from experience that this produces better results when entering prepaid items in the total. Credit is taken on the debit side of the cash book in red ink for refunds made on credit waybill corrections.

When all the entries for the day are in, the various columns are footed and the balance of cash on hand is entered in the "Total" column on the credit side. The totals appearing in the debit and credit "Total" columns must agree, of course. The totals of each column, excluding "Total," are first accumulated and then the last accumulation is cross-footed. Unless all cash has been remitted, which must be done for the last day of the month, the accumulated amount now appearing in the debit and credit "Total" columns *will not agree*, the difference being cash on hand.

PRINCIPLES FOR PROVING TO A KNOWN TOTAL

It will be noted that the agent's debit accounts have been sectionalized by the use of three abstracts, and the credit accounts by two abstracts and three columns in the cash book. Proving to a known total is based on the following principles, three of which we believe will find common acceptance, and one which perhaps is debatable:

1. If to the debit of the station on the first of the month, there are added all debits for any period, the sum must be total debit of station. The same must be true of credit side.
2. If to the uncollected freight on the first of the month there is added freight received collectible for any period, and from this sum is deducted freight collected during such period, the difference must be unpaid freight collectible to date. This principle must apply to all other debit and credit items.
3. If from total advances forwarded during any period, there are deducted the advances paid, the difference must be amount due connecting roads. To this sum must be added amount prepaid beyond, if any.
4. For our purpose, we define "freight received collectible" as the sum of local and advance charges, plus debit corrections, minus credit corrections. To determine freight received collectible, as above defined, separate columns must be provided in agent's records and general office records for debit and credit corrections, or debit corrections added to, and credit corrections deducted from freight received. This latter method of handling debit and credit corrections is common practice, though not for the reason stated.
5. As prepaid forwarded is charged by auditor to forwarding agent and credited (in theory) to receiving agent, it follows that receiving agent has cash credit with company represented by the prepaid on waybills to his station and, therefore, when such a waybill is received, he is authorized to take credit in his cash book for such amount and to charge himself back with the freight charges. If a consignee remits direct to the company (the United States government and municipalities often do this) the amount so received is credited direct to the agent by the auditor. As the agent has credit with the company for the amount, he charges himself with the freight charges and takes proper credit ("Special Credit"). There is no difference in principle between such a transaction and forwarding agent collecting freight charges in advance and remitting to company. The difference lies solely in the way the two transactions are handled through the books. In one case, the amount is credited to agent direct, and in the other to a suspense account pending adjustment of the agent's account.

PROVING CORRECTNESS OF THE AGENT'S BALANCE

The correctness of the agent's balance report may be proved by totals, by accumulating the totals for each day's business, sectionalizing the agent's accounts, handling corrections by adding to or deducting from station debit, taking credit on the debit side of the cash book in red ink for refunds made and handling "Prepaid Received" through the cash book. The procedure is shown by the following illustration.

1. To debit from last report, $1,423 add: total, received abstract, $425; prepaid, forwarded abstract, $50; total, miscellaneous abstract, $22; the sum $1,920 is total debit to next report.
2. To uncollected on first of month (assumed) $200, add the following accumulated totals: total received abstract, $1,400; prepaid, forwarded abstract, $200; total, miscellaneous abstract, $120; the sum $1,920 again is total debit to next report.
3. Add accumulated totals, as below: prepaid, received abstract, $300; advances, forwarded abstract, $300; miscellaneous, $30, company material, $50, cash $800, cash book; the sum $1,480 is total credit to next report.
4. From accumulated total of advances, forwarded abstract, $300, deduct accumulated total of advances forwarded, cash book $250; the difference, $50, is amount due connecting roads' advances.
5. From accumulated total prepaid, received abstract, $300 deduct accumulated total of prepaid received, cash book, $270; the difference, $30, is amount due connecting roads' prepaid received. Contra, total of local and advances is entered on credit side as due from connecting roads.
6. From uncollected on first of month, $200, deduct accumulated total of uncollected previous month, cash book, $175; the difference, $25, is uncollected, old.
7. From accumulated total, received abstract, $1,400, deduct accumulated total of freight charges, cash book, $1,000; the difference $400, is unpaid freight received collectible; from accumulated total prepaid, forwarded abstract, $200, deduct accumulated total prepaid forwarded, cash book, $150; the difference, $50, is uncollected prepaid forwarded: from total, miscellaneous abstract, $120, deduct accumulated total of miscellaneous, cash book, $100; the difference, $20, is uncollected miscellaneous charges; from the sum of the three items as above, $470, deduct amount due from connecting roads, $20; the difference, $450 is uncollected current.
8. From accumulated debit total of cash book, $1,425, deduct accumulated credit, $1,400; the difference, $25, is cash on hand.
9. To accumulated debit total of cash book, $1,425, add all uncollected items on balance report, ($20, $25 and $450) $495; the sum, $1,920, is total debit to next report.
10. To accumulated credit total of cash book, $1,400, add total amounts due connecting roads, $80; the sum, $1,480 is total credit to next report.

It should be understood that our agents do not use all the above proofs every day, but they do use a sufficient number to prove correctness of the daily balance report. Every one of these proofs, however, is used by the traveling auditor when he is checking a station.

WORK OF THE TRAVELING AUDITOR

This method of handling the daily station accounts makes it impossible for an agent to leave any kind of an error uncorrected, provided only he verifies his "Uncollected" by drawing off his open items on the three abstracts, and the "Uncollected Report." In tabulating his "Uncollected" he can determine which one of four divisions is out of balance, and the amount. The greatest difficulty the traveling auditor encounters in checking a station arises from the failure of an agent thus to prove his "Uncollected." We have agents, however, who rarely receive a balance report correction from the auditor.

It is extremely easy for a traveling auditor to check a station under the system as outlined. He usually is supplied by the auditor with the total amounts charged on the books for each column on the ledger to the last day the station account has been audited, or he can secure these figures by telephone. He compares such figures with the accumulated totals on the agent's records, and if they agree he has only to check the station to date. Aside from establishing the "Uncollected," the heaviest station on the road can be checked in two or three hours. In fact, practically the entire duty of the traveling auditor consists in checking the "Uncollected." He draws off on the "Received Abstract" form unpaid items from the three abstracts and report of "Uncollected," proving the correctness of the open items by methods 6 and 7. Both the original and duplicate are signed by the agent and the traveling auditor, and the original is sent to the auditor's office. The uncollected charges on freight delivered are verified by telephone, personal call or return postal cards. We also have adopted the policy of mailing such postal cards from the auditor's office for unpaid items on agent's monthly report of "Uncollected."

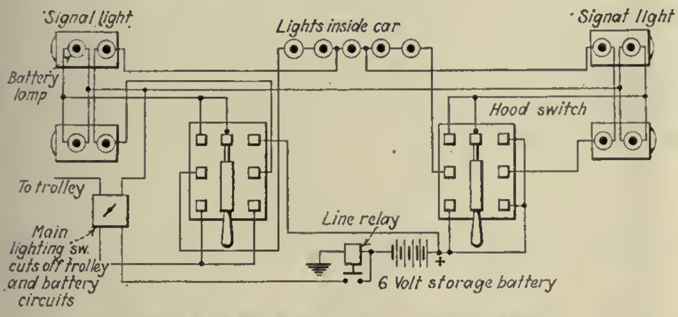
It readily will be seen that the proving by totals as above outlined can be obtained by any system of daily accounts if some method of accumulating totals is provided. The daily totals of each abstract, for example, could be recapitulated upon an abstract sheet and the totals kept up to date. Unless the "Prepaid Received" is handled through the agent's cash, the unpaid "Prepaid Beyond" cannot be proved by totals.

Electric Signal and Tail Lights for Cars

The Use of an Inside Shell, Fitted with Glass of Different Colors, Which Can Be Rotated Between the Lamps and the Lens, Permits a Variety of Indications to Be Given

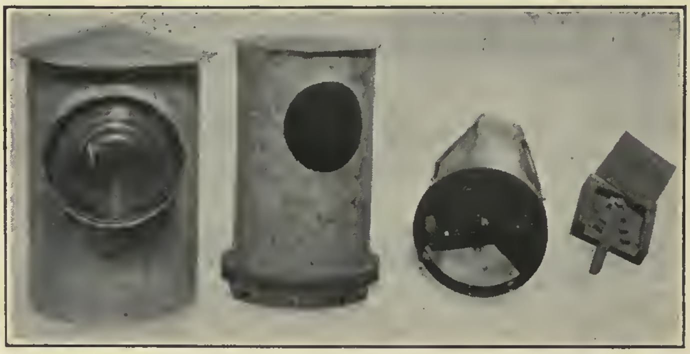
THE USE of oil lamps on cars for tail lights and signal lights entails considerable labor and annoyance. They must be removed and reinstalled on the cars every day, and the labor of filling and trimming lamps is considerable. To replace oil lamps for this purpose the Lehigh Valley Transit Company, Allentown, Pa., is equipping all of its cars with electric signal and tail lights. Accompanying illustrations show the type of construction employed and the connections for the signal circuits.

For interurban cars four lights are used. These are located one at each corner of the car on the roof. Cars in suburban and city service have two lights, located at diagonally opposite corners of the car, on the front left-hand and rear right-hand sides. Brackets are provided for supporting these on the vestibule corner posts. The lanterns, switches and wiring connections were designed and constructed by the railway company. There are four signal displays for each lamp. These are red, green, white, and a dark signal. Two lamps are installed in each signal, one being operated from the main lighting circuit at times when lights are required, and an emergency light operated from a battery circuit. This operates automatically in case the trolley pole should leave the wire, or the normal lighting circuit be interrupted for any cause. The lighting circuits are so arranged that whenever the signal lights are turned off the lighting circuit is completed through lights installed inside the cars. The diagram of connections shows how this is accomplished.



Wiring Diagram for Four Signal Lamps

Signal Lantern Installed on Roof of Interurban Car



Details of Signal Lantern. The Parts as Arranged from Left to Right Are Outside Casing, Middle Unit, Inside Unit and Light Switch

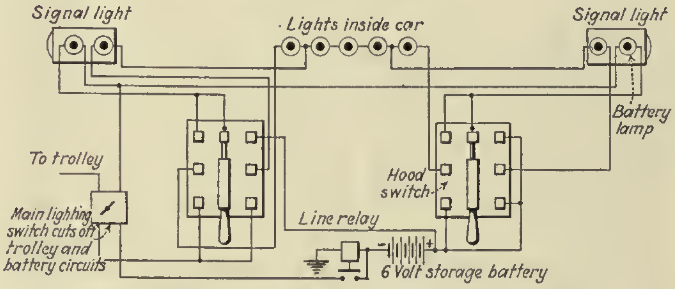


Diagram of Connections for Two Signal Lamps

The lanterns consist essentially of three parts, an outside hood made of galvanized iron with a sloping roof protection and fitted with a clear glass lens. This outside portion on interurban cars is fitted to the outside of the roof, and the other parts installed from inside the vestibule. The second unit of the lamp construction consists of a cylindrical galvanized iron part which fits inside the outside portion. An iron ring is used as a spacing block and provides for riveting these two parts together. The second portion has a hole cut in it for the rays of light to reach the lens. The third unit of the construction has an upper part, which is hexagonal in shape. Three of these sides contain glass of red, green and white color. The lamps are installed inside this third unit, the battery lamp being located in front of the trolley voltage lamp. The base of this third unit is of heavy sheet iron and has four projecting screws for fastening to the second unit of the construction. When the inside unit is installed three screws fit into slots in the second unit and by turning to the right this unit is locked in the position. A bottom spring handle fits into a slot and locks in position when released. To unlock for rotating to change the signal color this handle is pulled down, which releases the lock, and the inside portion then can be rotated so as to change the color for the signal indication. In order that the operator may know readily what color is being displayed, without the necessity of looking outside, the bottom of this third unit is painted with three colors—red, green and white. By having the color desired toward the front end of the car, the operator is assured that the signal of proper color is displayed.

The switch for controlling the lights is of a two-directional type. When the handle is thrown to the left the lights are out and when it is thrown to the right the circuit is closed. The battery circuit is controlled through a line relay, so that whenever power is off the dropping of this line relay closes the circuit and automatically lights the battery lamps. Six-volt lamps are used in the battery circuit and 210-volt lamps in the main lighting circuit. Energy for the battery circuit is furnished by an Ohio Brass Company's 6-volt battery.

When Sickness Stops Wages, What?

Survey of 2,000 Group Insurance Beneficiaries Indicates 60 per Cent of Workers Furnish the Only Family Income—94 per Cent Receive No Income During Disability Other than Group Insurance

SOME startling information was developed in the survey recently completed by Dr. William B. Bailey, economist of the Travelers' Insurance Company, to determine the extent of the need for accident and sickness insurance in addition to that afforded by workmen's group insurance, carried by many industrial corporations, including some electric railways. It was found that 90 per cent of the disabilities among wage earners are caused by sickness or non-occupational accidents. The most common cause of absences due to disabilities are influenza, bronchitis, rheumatism, and tonsillar trouble. Of the applications for charity from families ordinarily self-supporting, 50 per cent are the result of sickness. Only one worker in twenty who has group accident and sickness insurance carries any other form of accident and sickness benefit. Twelve workers are the sole support of themselves and dependents to every eight who benefit from additional incomes earned by other wage earners in the family, or by room rent or board money paid to the family. There are nine wage earners without dependents to every eleven with dependents, each of the latter supporting an average of 2.2 other persons.

The average period of absence from work caused by disability is four weeks, and the beneficiaries of group accident and sickness insurance receive an average of $50.84, or at the rate of $12.58 a week for each disability.

In making the survey the company requested its adjusters to visit the homes of the beneficiaries of its group accident and sickness policies and obtain information covering the weekly wages of the worker, statistics regarding those dependent upon the weekly wages, statistics regarding those dependent upon him, and other similar information. This was continued until 2,000 questionnaires were completed. The study is based upon the tabulation of this material.

AMOUNT OF BENEFITS PAID

An analysis of the benefits paid the 2,000 workers showed that 46 per cent of the beneficiaries received under $30, while more than one-quarter received over $50, and about one-eighth received $100 or over. Out of these 2,000 workers 1,887, or 94 per cent, received no benefit except from their group insurance during their period of incapacity. The 113 with additional benefit received a total of $4,408, or an average of $39. If those insured are typical of the average industrial worker in this country, he receives as benefits during a sickness lasting more than a week a total of somewhat less than $2.50. It is quite likely, however, that in many cases when the workman came under group accident and sickness insurance, he gave up any other form of sickness insurance he may have carried. The additional benefit paid the few workers who carried other forms of insurance correspond closely to the amount received under the group insurance policies. It is interesting to note that of those who received less than $75 in benefit from group insurance only 4 per cent received any additional benefit, while of those receiving $75 and over from group insurance 12.9 per cent received additional benefit.

TABLE I—WEEKLY WAGES OF BENEFICIARIES DISTRIBUTED ACCORDING TO ADDITIONAL FAMILY INCOME

Weekly Wages of Beneficiaries	Number	Per Cent	Receiving Additional Family Income Per Cent in Each Wage Group	Receiving Additional Family Income Average Weekly Additional Family Income
Under $15	352	17.6	64.3	$24.77
$15–19	513	25.7	50.1	27.60
20–24	347	17.3	33.7	27.96
25–29	331	16.6	32.0	30.38
30–34	260	13.0	30.0	26.81
35–39	93	4.6	22.6	23.33
$40 and over	104	5.2	15.4	26.72
$47,175	2,000	100	....	$23.59

The average weekly indemnity received by the beneficiaries from their group insurance was $12.58. When one realized that in 94 per cent of the cases this was the only benefit received during the period of incapacity, it must have been a very welcome substitute for the earnings of the breadwinners.

FAMILY INCOME

The income of the 2,000 families came from the wages of the insured together with additional income in some cases, derived principally from wages of other breadwinners and from roomers and boarders. The weekly wages of the beneficiaries are given in Table I.

TABLE II—ADDITIONAL INCOME IN FAMILIES OF BENEFICIARIES

Additional Weekly Income	Number	Per Cent
None	1,190	59.50
Under $10	13	0.65
$10–19	208	10.40
20–29	275	13.75
30–39	178	8.90
40–49	50	2.50
$50 and over	56	2.80
Unknown	30	1.50

The distribution of families with respect to weekly income in addition to wages of the beneficiaries is given in Table II.

Only 810 families enjoyed an income in addition to the wages of the insured, with the additional weekly income averaging $27.61 in these more fortunate cases. The other 60 per cent relied entirely upon the earnings of the insured for their support, and when it is taken into consideration that in 94 per cent of the cases there is no benefit received during incapacity, the problem of financing a protracted illness is not an easy one.

In the 1,190 families in which there was no income

TABLE III—DISTRIBUTION OF BENEFICIARIES ACCORDING TO NUMBER OF DEPENDENTS

Number of Dependents per Family	Number	Per Cent	Number of Dependents
0	886	44.30	...
1	493	24.65	493
2	268	13.40	536
3	162	8.1	486
4	88	4.4	352
5	42	2.1	210
6	26	1.3	156
7	24	1.2	168
8	7	0.35	56
9	3	0.15	27
11	1	0.05	11

except the wages of the insured the average weekly wages were $22.83, while in the 810 families receiving additional income the wages were $24.70. There were 502 cases in which the additional income exceeded the weekly wages, but in only 11 of these families were the weekly wages of the beneficiaries more than $20.

NUMBER OF DEPENDENTS

In the 2,000 families there were 2,495 dependents, the distribution of whom is given in Table III.

Although in 886 cases there was no one dependent upon the wages of the insured, as the amount of weekly benefit from group insurance increased, so did the proportion of beneficiaries with dependents and the average number of dependents in the family. Those receiving benefit of less than $5 a week are without dependents in nearly three cases out of four, while of those enjoying a weekly benefit of $25 or over, more than three-quarters have dependents and the average number to the family is 2.5. This difference to a large measure is due to the fact that most of those earning small wages are young and unmarried.

TABLE IV—LENGTH OF DISABILITY

Period of Indemnity	Beneficiaries Number	Per Cent
Under one week	243	12.15
One week—one week six days	544	27.20
Two weeks—two weeks six days	301	15.05
Three weeks—three weeks six days	196	9.8
Four weeks—four weeks six days	222	11.1
Five weeks—five weeks six days	119	5.95
Six weeks—six weeks six days	109	5.45
Seven weeks—seven weeks six days	64	3.2
Eight weeks—eight weeks six days	44	2.2
Nine weeks—nine weeks six days	25	1.25
Ten weeks—ten weeks six days	31	1.55
Eleven weeks—eleven weeks six days	19	0.95
Twelve weeks—twelve weeks six days	11	0.55
Thirteen weeks—twenty-six weeks	44	2.2
Twenty-seven weeks—fifty-two weeks	28	1.4

It might be expected that the family in which there are many dependents would enjoy the largest weekly income in addition to wages, but the investigation does not bear this out. The number of dependents has but little influence upon the additional weekly income of the family. The deviation from the average of $27.06 is remarkably small, the range being between $22 and $29.

PERIOD OF INDEMNITY

The distribution of the 2,000 beneficiaries according to the period during which they received payments is given in Table IV.

This table shows that the greater portion of the disabilities were short, nearly 40 per cent of them lasting less than two weeks. The average disability was almost exactly four weeks.

The eight leading causes of disability accounted for 1,299 cases, or 65 per cent of the total, as given in Table V.

TABLE V—CAUSES OF DISABILITY

Cause	Number of Cases	Duration of Disability
Influenza	579	2.4 weeks
Bronchitis	192	5.1 weeks
Rheumatism	147	5.1 weeks
Tonsillar trouble	101	2.5 weeks
Non-occupational accidents	96	4.0 weeks
Diseases of the skin and cellular tissue	78	4.1 weeks
Diseases of genito-urinary system (non-venereal)	53	5.5 weeks
Appendicitis	53	6.7 weeks

The largest cause of disability—influenza—accounted for more than a quarter of the total cases, but the duration of the sickness was comparatively short. On the other hand, the average period for which indemnity was paid for tuberculosis was about six months and for pneumonia somewhat over twelve weeks. In more than 10 per cent of the cases the disability continued for more than two months.

One-Man, Two-Man Cars for Hydro-Electric Railways

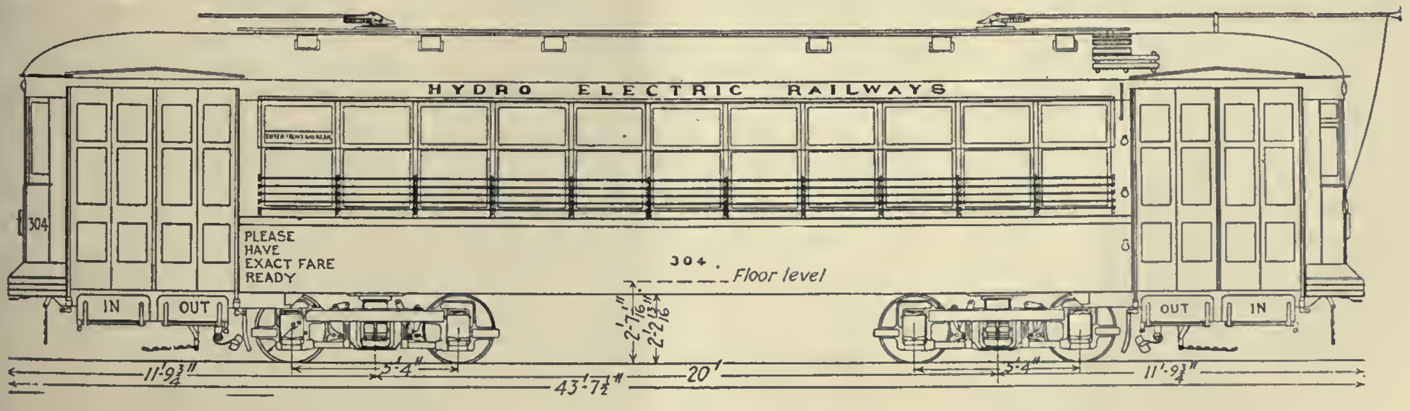
AN ORDER has recently been placed for four double-end, double-truck, one-man two-man safety cars for use by the Ontario Railway Department of the Hydro-Electric Railways. The cars will be of steel construction and of dimensions as shown in the accompanying illustration.

The roof will be built of tongued and grooved poplar $\frac{7}{16}$ in. thick, covered with No. 8 18-oz. canvas. The floor will be laid in two courses, the bottom one to be $\frac{7}{16}$-in. tongued and grooved white pine and the top to be of $\frac{13}{16}$-in. maple, grooved in the aisle to form a mat. Two layers of waterproof paper will be placed between the two floor courses. The floor will be ramped 1 in. in the aisle and 1 in. to both sides of the platform.

There will be two pairs of folding doors for each vestibule. Each pair of doors will be hung on ball-bearing shafts and will be joined with ball-bearing hinges. The doors will be operated independently by pneumatic door engines which are installed in pockets over the doors. The steps are arranged in two units and will operate in conjunction with the doors. A selector valve will control the operation. The doors will have 32-oz. plain glass in the upper panel, 32-oz. wired

PRINCIPAL DIMENSIONS AND WEIGHTS OF CARS

Length over all	43 ft. $7\frac{1}{2}$ in.
Length over car body	28 ft. 9 in.
Width over all	8 ft. 5 in.
Height from top of rail to top of roof	10 ft. $\frac{3}{4}$ in.
Height from rail to top of floor in body	2 ft. $7\frac{1}{16}$ in.
Seat spacing	2 ft. 6 in.
Post spacing	2 ft. 6 in.
Truck centers	20 ft.
Approximate weight of car body	20,000 lb.
Approximate weight, control equipment	1,200 lb.
Approximate weight, air brake equipment	1,060 lb.
Approximate weight, motors, gears and cases	4,000 lb.
Approximate weight, trucks	10,000 lb.
Approximate total weight	36,260 lb.



Double-End, Double-Truck Safety Car Hydro-Electric Railways, Ontario glass in the center panel and the lower panel will be finished in cherry.

The interior finish of the car will be birch, the head lining will be Agasote covered with birch molding. The wainscoting below the seat rests will be of birch and above will be of Agasote. Curtains will be of Pantasote and all car trimmings will be of bronze.

The seating will consist of nine reversible transverse seats on each side of the car and two longitudinal seats, thus giving a total seating capacity of forty-four. The seats will be spring upholstered and covered with rattan. The car trucks will be the Taylor equalized type. The wheelbase is 5 ft. 4 in., and 26-in. diameter steel wheels will be used with 3¾x7-in. journals. The cars will be equipped with 4 G. E.-264 motors of 25 hp. each and the control equipment will be G. E. type K.

These cars are being built by the St. Louis Car Company, St. Louis, Mo., and will be operated in local series in Walkerville, Windsor and Sandwich, Ont. The intention of the management is to use these with two men during peak hour periods and for one-man operation at other times.

Telephoning Over Power Lines

Michigan Company Installs Wired Wireless to Connect Power Plant with Substations—Tests Made Indicate Value of Plan

THE high-frequency automatic telephone system just installed on the transmission lines of the Consumers Power Company of Michigan has been opened formally. The demonstration was in charge of B. E. Morrow and C. W. Tippy, officials of the company. The visitors, who held conversation with the load dispatcher and operators in a power plant 50 miles distant, marveled at the extreme clearness with which conversation could be conducted.

This system has just been installed by engineers of the Westinghouse Electric & Manufacturing Company. Only two sets are completed, these being located at Jackson and Battle Creek, Mich., while four other similar sets will be installed. In all there will be 600 miles of transmission line utilized for telephone service.

This installation is said to be a long step in advance of anything yet attempted with so-called "wired wireless." Previous installations have been but adaptations of the familiar radio broadcasting equipment providing only one-way communication.

In this system two frequencies are used, the dispatcher's set transmitting approximately 50,000 cycles and receiving 60,000 cycles, while the Battle Creek set transmits 60,000 cycles and receives 50,000 cycles. In effect, there are two transmitting sets and two receiving sets in service working through single telephone instruments, with the result that the service is duplex and both parties may talk and listen simultaneously.

To communicate with Battle Creek, the load dispatcher at Jackson has only to lift his telephone receiver from the hook, which automatically starts up the radio transmitting apparatus. The dispatcher then turns the dial on his instrument to the number assigned to Battle Creek. The operation of this dial sends out modulated high-frequency impulses which are picked up on the receiving antenna at the latter plant and cause a selector there to step around and stop at the proper point and, through the operation of a system of relays, ring a bell or sound a horn.

The Battle Creek operator unhooks his telephone receiver. This automatically starts up his transmitting radio set. The two voices pass each other, carried on different wave lengths, but all is tied into the two ordinary telephone instruments and controlled through them.

Operation of the system is so simple and so stable that it gives not the slightest hint of the months of study and experimentation that have taken place in the Westinghouse organization to combine the automatic telephone and radio elements for transmitting over power lines. Tests have shown that in event of line failure, the radio impulses jump the gaps and communication is not interrupted, even when several miles of the transmission line are down. This feature of the high-frequency telephone system gives it a marked advantage for load dispatching over the wire telephone system.

When the system is extended all the outlying substations will use the same transmitting and receiving frequencies or wave lengths as Battle Creek, so that the dispatcher will be able to talk with any station merely by dialing the proper call number on his desk phone. Outlying stations would not be able, under normal conditions, to talk with each other, but any substation operator, by dialing the number 10 on his phone, will automatically change his transmitting wave length so that, in action, his set then will operate just the same as the load dispatcher's set in Jackson and he can talk with any or all other stations. Another detail of the installation is the arrangement of extra selectors at the various substations through which the dispatcher, by dialing a general call number on his telephone, will ring all substations on the system and be able to transmit emergency orders simultaneously to all substation operators.

High-frequency current is generated by a 250-watt vacuum tube similar to those used in broadcasting stations, but instead of being broadcast through the air, it induces by electrostatic and electromagnetic induction corresponding high-frequency current in the adjacent power line. This high-frequency energy, superimposed upon the energy transmitted normally, is carried on the power line to the receiving station where, by induction, it is led into the receiving set, which is an ordinary long wave, coupled-circuit radio receiver, equipped with a detector and one-step amplifier. The largest broadcasting radio stations use transmitting sets of 500-watt capacity. The energy required to operate this telephone system is 250 watts, or just half the size, and larger than many of the other important broadcasting sets.

Picnic Cements Company Spirit

THE good relations existing between the East St. Louis & Suburban Railway and its employees were demonstrated on Monday, July 23, when the company gave an old fashioned basket picnic to all its employees. The outing was held at Jones Park, not far from East St. Louis. Special cars were run by the company to the park and transportation was free to anyone wearing the picnic badge. All park concessions were similarly free of charge to those wearing badges. The success of the outing may be judged from the enthusiastic reception of President W. H. Sawyer's statement, "This is our first picnic, but it will not be our last one." There was practically 100 per cent attendance of all employees.

American Association News

Executive Committee

FOR its regular meeting on Aug. 24, the executive committee of the American Association met on board the yacht *Florida* as the guests of Barron G. Collier, and enjoyed a trip up the Hudson River and back. Committee members present were President C. D. Emmons, Britton I. Budd, Robert I. Todd, F. R. Coates, C. E. Morgan, J. N. Shannahan, W. H. Sawyer, C. L. Henry, R. P. Stevens, L. C. Datz, Wallace Muir, Barron G. Collier, J. G. Barry, H. D. Shute, A. A. Hale, G. M. Haskell representing S. M. Curwen, and Secretary J. W. Welsh. J. P. Barnes and E. C. Faber also made this trip.

Brief reports of standing and special committees were heard, including that of the nominating committee whose report was confirmed by the executive committee. The nominees, which included Britton I. Budd for president, were announced in last week's issue of this paper. The membership committee reported two new railway members and nineteen new manufacturer members whose applications were approved.

F. C. J. Dell reported for the exhibit committee that on Aug. 24, 67,744 sq.ft. of exhibit space had been sold, of which 81 per cent had been paid for. This space sold compares with 62,219 sq.ft. total sold in 1919, 51,928 in 1920 and 62,095 in 1922.

The executive committee approved an amendment to the constitution which will come up for vote at the October convention. This provides that the action of a meeting at which there is not a quorum present may become official and binding if ratified by the next succeeding meeting at which a quorum is present.

Secretary Welsh reported that a beautiful wreath of flowers had been placed in the rotunda of the Capitol at Washington for President Harding's funeral, in the name of the Association.

The American Museum Association had requested co-operation of the railway association in establishing museums in every city. The executive committee approved and suggested that the company in each locality work with the Museum Association in supplying exhibit material.

A request from the Society of Automotive Engineers for the privilege to discuss at the convention the report of the T. & T. Association committee on trackless transportation was approved with the understanding that the discussion will be a prepared paper which will have the approval of the S. A. E. executive committee and will be passed upon by the executive committee of the American Electric Railway Traffic & Transportation Association. The society expressed its desire to co-operate with the railway association.

The next meeting of the committee will be held at 10 a.m. on Oct. 8, at the Marlborough-Blenheim Hotel, Atlantic City.

Valuation Committee

A MEETING of the valuation committee of the American Association was held in New York on Aug. 23. The draft of the committee's report to be submitted at the annual meeting was considered. Several changes were proposed and were incorporated in the report. With these amendments the report was approved for printing and distribution to the membership.

Those present were J. P. Barnes, chairman; W. H. Maltbie, W. B. Tuttle, Frank Silliman, Jr., A. S. Richey, A. B. Bennett representing A. T. Perkins, E. J. Bechtel, W. H. Sawyer, L. R. Nash and E. J. Murphy.

Programs of the American and Affiliated Associations

Dates: Monday, Oct. 8, to Friday, Oct. 12
Place: Young's Million Dollar Pier, Atlantic City, N. J.

Registration Headquarters on the Pier will be open on Sunday, Oct. 7

American Association

Monday Morning, Oct. 8

9:30 A.M. to 12:30 P.M.

Registration.

Tuesday Morning, Oct. 9

10:00 A.M. to 1 P.M.

Address of the President.
Report of the Executive Committee.
Report of the Executive Secretary.
Report of the Treasurer.
Appointment of the Committee on Resolutions.
Reports of Committees:
- Finance—J. H. PARDEE, president The J. G. White Management Corporation, New York, N. Y., chairman.
- Policy—B. I. BUDD, president The Metropolitan West Side Elevated Railway and the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.
- National Relations—C. L. HENRY, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.
- Committee of 100—GUY E. TRIPP, chairman board of directors Westinghouse Electric & Manufacturing Company, New York, N. Y., chairman.

Joint Committee of the National Utility Associations — RANDAL MORGAN, chairman of the executive and finance committee the United Gas Improvement Company, Philadelphia, Pa., chairman.
Trackless Transportation—H. B. FLOWERS, president New Orleans Public Service, Inc., New Orleans, La., chairman.
Uniform Motor Vehicle Regulatory Laws—C. D. CASS, general manager Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, chairman.
Construction and Maintenance of Highways for Motor Vehicles—W. J. HARVIE, vice-president and general manager Auburn & Syracuse Electric Railroad, Auburn, N. Y., chairman.
Discussion on "Co-ordination of Electric Railway and Bus Transportation," led by ALFRED REEVES, general manager National Automobile Chamber of Commerce, New York, N. Y.; L. S. STORRS, president the Connecticut Company, New Haven, Conn., and D. W. PONTIUS, vice-president Pacific Electric Railway, Los Angeles, Cal.
Luncheon of Committee on Co-operation of State and Sectional Associations, W. H. SAWYER, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

Wednesday Morning, Oct. 10

10 A.M. to 1 P.M.

Report of Nominating Committee—J. H. PARDEE, president J. G. White Management Corporation, New York, N. Y., chairman.
Election of Officers.
Report of Committee on Valuation—J. P. BARNES, president Louisville Railway, Louisville, Ky., chairman.
Report of Committee on Special Taxes—W. H. MALTBIE, special counsel United Railways & Electric Company, Baltimore, Md., chairman.
Address on "Essential Operating Costs," by F. W. DOOLITTLE, vice-president North American Company, New York, N. Y.

Symposium on Governmental Regulation

Address entitled "A Review of Recommendations of the Federal Electric Railways Commission as Result of Experience of the Last Four Years," by CHARLES E. ELMQUIST, of Clapp, Richardson, Elmquist, Briggs & McCartney, attorneys-at-law, St. Paul, Minn.

Addresses on "Public Utility Commission Regulation," by Henry C. Atwill, chairman Massachusetts Department of Public Utilities, Boston, Mass.; Henry C. Spurr, editor Public Utilities Reports, Inc., Rochester, N. Y.; Harry V. Osborne, president Board of Public Utility Commissioners of New Jersey, Newark, N. J.; Charles C. Marshall, commissioner the Public Utilities Commission of Ohio, Columbus, Ohio; Lewis E. Gettle, chairman Wisconsin Railroad Commission, Madison, Wis.; William Milnes Maloy, chairman State of Maryland Public Service Commission, Baltimore, Md.; Sherman T. Handy, commissioner Michigan Public Utilities Commission, Lansing, Mich.; Dwight N. Lewis, commissioner Iowa Railroad Commission, Des Moines, Iowa.

Thursday Morning, Oct. 11

10 A.M. TO 1 P.M.

Reports of Committees:

Community Sections—C. E. Morgan, vice-president Brooklyn City Railroad, New York, N. Y., chairman.

Constitution and By-Laws—C. L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

Company and Associate Membership—W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

Company Section and Individual Membership—Martin Schreiber, manager southern division and chief engineer Public Service Railway, Camden, N. J., chairman.

Publicity—F. R. Coates, president Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio, chairman.

Publications—L. S. Storrs, president the Connecticut Company, New Haven, Conn., chairman.

Co-operation of Manufacturers—E. F. Wickwire, secretary Ohio Brass Company, Mansfield, Ohio, chairman.

Mail Pay—L. H. Palmer, general manager United Railways & Electric Company, Baltimore, Md., chairman.

Insurance—J. T. Staub, treasurer United Railways & Electric Company, Baltimore, Md., chairman.

Education—Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman.

Co-operation with State and Sectional Associations—W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

Charles A. Coffin Prize—C. D. Emmons, president United Railways & Electric Company, Baltimore, Md., chairman.

Address on "The Relation of Management and Employees," by Dr. C. A. Lippincott, the Studebaker Corporation, South Bend, Ind.

Unfinished Business.

Installation of Officers.

Accountants' Association

Monday Afternoon, Oct. 8

Inspection of exhibits.

Tuesday Afternoon, Oct. 9

2 to 4:30 P.M.

Address of the President.

Report of the Executive Committee.

Report of the Secretary-Treasurer.

Appointment of Convention Committees:

(a) Resolutions.
(b) Nominations.

Report of committee appointed to represent Accountants' Association at Annual Convention of National Association of Railway and Utilities Commissioners—W. L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa., chairman.

Report of Budget Committee—T. B. MacRae, general auditor Chicago Elevated Railways, chairman.

Address on "Construction Cost Accounting," by Weston J. Hibbs, treasurer U. G. I. Contracting Company, Philadelphia, Pa.

Wednesday Afternoon, Oct. 10

Joint session with Engineering Association

2 to 3 P.M.

Report of Joint Committee on Engineering Accounting—L. R. Brown, office and field engineer New York State Railways, Rochester, N. Y., and G. F. Dineen, auditor Holyoke Street Railway, co-chairmen.

At the conclusion of the discussion of the report of the Joint Committee on Engineering Accounting, the accountants will adjourn to their meeting room, where their session will be continued.

3 to 4:30 P.M.

Report of Committee on Standard Classification of Accounts—Robert N. Wallis, treasurer Fitchburg & Leominster Street Railway, Fitchburg, Mass., chairman.

Report of Committee on Relations with Other Associations—M. W. Glover, general auditor West Penn Railways, Pittsburgh, Pa., chairman.

Paper on "Operating Reports and Their Usefulness to the Management," by Edwin H. Reed, auditor Brooklyn City Railroad.

Thursday Afternoon, Oct. 11

Past-Presidents' Day

2 TO 4:30 P.M.

Report of Committee on Stores Accounting—R. A. Weston, special accountant the Connecticut Company, New Haven, Conn., chairman.

Address on "The Utility Accountants' Obligation to the Public," by Dwight N. Lewis, president National Association of Railway and Utility Commissioners, Des Moines, Iowa.

Report of Convention Committees:

(a) Resolutions.
(b) Nominations.

Election of Officers.

Installation of Officers.

Claims Association

Monday Afternoon, Oct. 8

2:30 to 5 P.M.

Address of the President.

Report of the Executive Committee.

Report of the Secretary-Treasurer.

Reports of Special Committees.

Appointment of the Nominating Committee.

Paper on "A Code of Ethics," by Hon. Russell A. Sears, general claims attorney Boston Elevated Railway.

Report of Committee to Investigate and Report on the Proper Organization of the Claims Department—W. E. Robinson, claim agent Cincinnati Traction Company, chairman.

Written Discussion—H. V. Drown, Public Service Railway, Newark, N. J.

Submission of questions for the Question Box, answers and discussions to be taken up at Thursday afternoon session.

Tuesday Afternoon, Oct. 9

2:30 TO 5 P.M.

Report of Committee on Automobile Accidents—G. T. Hellmuth, general claim agent Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

Discussion on Automobile Accidents:

From the Transportation Standpoint—Ralph W. Emerson, general manager Cleveland Railway, Cleveland, Ohio.

From the Claim Department Standpoint—L. F. Wynne, general claim agent Georgia Railway & Power Company, Atlanta, Ga.

Wednesday Afternoon, Oct. 10

2:30 to 5 P.M.

Joint session with Transportation and Traffic Association

Report of Joint Committee on Accident Prevention—H. B. Potter, assistant to the president United Railways & Electric Company, Baltimore, Md.; H. O. Allison, safety engineer Beaver Valley Traction Company, New Brighton, Pa., co-chairmen.

Discussion led by W. G. Fitzpatrick, general claims attorney Detroit United Railway.

Report of special committee on Co-operation with National Safety Council—L. H. Palmer, general manager United Railways & Electric Company, Baltimore, Md., chairman.

Paper on "Maintenance of Men," by Dr. Hart E. Fisher, chief surgeon the South Side Elevated Railway, Chicago, Ill.

Thursday Afternoon, Oct. 11
2:30 to 5 P.M.

Paper on "Preparation of Litigated Claims," by E. F. LIVINGSTON, chief investigator of litigated claims, Boston Elevated Railway.

Answers and general discussion of questions previously submitted for the Question Box.

Report of Nominating Committee and Election of Officers.

Installation of Officers.

Presentation of Past-President's badge.

Engineering Association

Monday Afternoon, Oct. 8
2 to 5 P.M.

Address of the President.

Report of the Executive Committee.

Report of Secretary and Treasurer.

Appointment of Convention Committee on Resolutions.

Reports of Committees:
- Methods of Voting on Standards—C. S. KIMBALL, engineer of way and structures, Washington Railway & Electric Company, chairman.
- Revision of Engineering Manual—R. C. CRAM, engineer of surface roadway, Brooklyn Rapid Transit Company, chairman.
- Unification of Car Design—H. H. ADAMS, superintendent of shops and equipment Chicago Surface Lines, chairman.
- Heavy Electric Traction—SIDNEY WITHINGTON, electrical engineer New York, New Haven & Hartford Railroad, New Haven, Conn., chairman.
- Wheel Tread and Flange Contours and Rail Head Contours—H. H. ADAMS, superintendent of shops and equipment Chicago Surface Lines, chairman.

Tuesday Afternoon, Oct. 9
2 to 5 P.M.

Reports of Committees:
- Equipment—F. H. MILLER, vice-president Louisville Railway, chairman.
- Buildings and Structures—N. E. DREXLER, chief engineer Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.
- Wood Preservation—H. H. GEORGE, engineer of maintenance of way, Public Service Railway, Newark, N. J., chairman.
- Air Reservoir Specifications—R. H. DALGLEISH, chief engineer Capital Traction Company, Washington, D. C., chairman.
- Paper on "Organization and Accomplishments of the Association of Electric Railway Men in Mechanical Departments of Southern Properties," A. D. MCWHORTER, general superintendent Memphis Street Railway.

2 to 5:30 P.M.

Simultaneous Session of Purchasing Agents and Storekeepers under auspices of Committee on Purchases and Stores of the Engineering Association.

Address of Welcome—L. C. DATZ, president American Electric Railway Engineering Association and chief engineer Little Rock Railway & Electric Company and Memphis Gas & Electric Company.

Report of Committee on Purchases and Stores—B. J. YUNGBLUTH, supervisor of purchasing and supplies Philadelphia Rapid Transit Company, chairman.

Outline of Purpose and Constructive Work Planned by the Committee on Purchases and Stores—W. H. STAUB, purchasing agent United Railways & Electric Company, Baltimore, Md.

Proper Control and Handling of Materials and Supplies—P. F. MCCALL, superintendent of materials and supplies Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.

Wednesday Afternoon, Oct. 10
2 to 3 P.M.

Joint session with Accountants' Association (See Accountants' Association Program).

3 to 4:30 P.M.—At the conclusion of the joint session the accountants will adjourn to their meeting room and the program of the Engineering Association will be continued.

Reports of Committees:
- Purchases and Stores—B. J. YUNGBLUTH, supervisor of purchases and supplies Philadelphia Rapid Transit Company, chairman.
- Way Matters—W. F. GRAVES, engineer, New York City, chairman.
- Welded Rail Joints—Research—W. W. WYSOR, chief engineer United Railways & Electric Company, Baltimore, Md., chairman sub-committee No. 5 of the Committee on Way Matters.
- Automatic Substations — W. E. BRYAN, superintendent of power United Railways of St. Louis, chairman.

Thursday Afternoon, Oct. 11
2 to 5 P.M.

Reports of Committees:
- Power Distribution—M. B. ROSEVEAR, superintendent of distribution Public Service Railway, Newark, N. J., chairman.
- Power Generation—C. A. GREENIDGE, chief engineer J. G. White Management Corporation, New York City, chairman.
- Standards — MARTIN SCHREIBER, manager southern division and chief engineer Public Service Railway, Camden, N. J., chairman.

Report of Convention Committee on Resolutions.

Report of Committee on Nominations—F. R. PHILLIPS, acting general manager for receivers, Pittsburgh Railways, chairman.

General Business.

Election and Installation of Officers.

Presentation of badge to retiring President.

2:30 P.M.

Meeting of Executive Committee and Committee on Subjects.

Transportation and Traffic Association

Monday Afternoon, Oct. 8
2:30 TO 5:30 P.M.

Address of the President.

Report of the Executive Committee.

Report of the Secretary and Treasurer.

Appointment of Convention Committees:
- (a) Resolutions.
- (b) Nominations.

Report of Committee on Traffic Regulations—H. B. FLOWERS, president New Orleans Public Service, Inc., chairman.

Report of Committee on Merchandising Transportation — SAMUEL RIDDLE, vice-president Louisville Railway, chairman.

Discussion led by F. W. SHAPPERT, traffic manager Chicago, North Shore & Milwaukee Railway, Chicago, Ill.

Tuesday Afternoon, Oct. 9
2:30 TO 5 P.M.

Report of Committee on Nominations.

Election of Officers.

Report of Committee on One-Man-Car Operation—J. P. POPE, general manager Kentucky Traction & Terminal Company, Lexington, Ky., chairman.

Report of Committee on Bus Operation—W. J. FLICKINGER, assistant to the president the Connecticut Company, New Haven, Conn., chairman.

Wednesday Afternoon, Oct. 10
2:30 TO 5:30 P.M.

Joint Session with Claims Association. (See Claims Association Program.)

After the joint session the association will proceed to general business, including the installation of officers and presentation of the Past-President's badge.

Entertainment

SUNDAY, OCT. 7 — Golf tournament in the afternoon. There will be a sacred concert at the Marlborough-Blenheim Hotel in the evening.

MONDAY, OCT. 8—9 p.m.—Opening dance on the pier in honor of the president and officers.

TUESDAY, OCT. 9—3:30 to 5 p.m.—Cards and refreshments in the Vernon Room, Haddon Hall. Carnival with dancing in the evening on the pier.

WEDNESDAY, OCT. 10. — 3:30 to 5 p.m.—Cards and refreshments in the Library Room, Traymore Hotel, 9 p.m.—Grand Ball at the Ambassador Hotel.

THURSDAY, OCT. 11 — 3:30 to 5 p.m. — Entertainment by popular mind reader. Refreshments. Ritz-Carlton Hotel. In the evening swimming and dancing features, Ambassador Hotel. Optional feature, theater party.

The exhibits will be open for inspection on all of the days of the convention including Friday, Oct. 12.

Maintenance of Equipment

Car Remodeling Job in Chattanooga

THE Chattanooga Railway & Light Company has a number of cars which are out of style, although the bodies are still in good physical condition. These cars weigh, equipped, 36,000 lb., and they are provided with two 60-hp. motors each on maximum traction trucks. It was recently decided to remodel these cars and the work is now under way.

The most striking change in the cars is due to the sheathing of the sides below the belt rail with sheet steel $\frac{1}{16}$ in. thick. The sides were previously curved inward at the bottom, whereas it was desired to have the new sheathing vertical. Hence blocks were built out on the posts, and horizontal strips were attached at the bottom and half way up to the belt rail. The sheathing is screwed to these blocks and strips, and a steel finishing strip is attached at each post to give a paneled effect.

The bulkheads were previously closed by means of doors and central windows. All doors and windows are being removed and the openings cased in, as shown in one of the illustrations. Headlinings of beaver board painted on both sides and all edges are being installed under a wood roof covered with canvas.

Electric heaters are being added in the vestibules.

Washing Costs 17.6 Cents per Car at Nashville

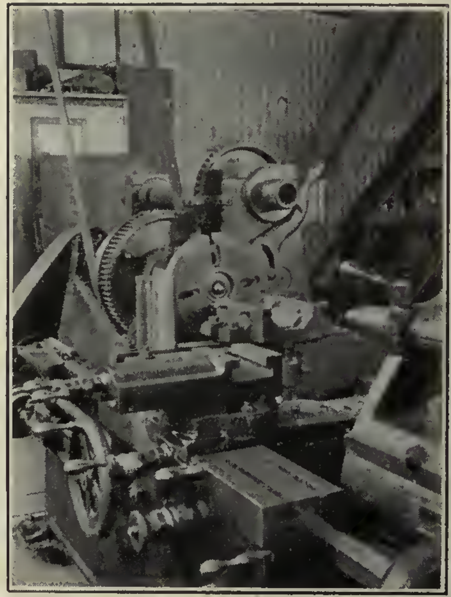
CARS are washed in the carhouse of the Nashville Railway & Light Company as a part of the regular inspection. This work is done during the day by three negro women, who wash on an average thirty-five cars per day. They use in this work the Royal car cleaner, made by the Clymer Chemical Company, Mount Vernon, Ill.

The labor cost per car is 11.6 cents, the cleaner 2 cents, the water 3 cents and sundries such as wear and tear of hose, etc., 1 cent, making a total of 17.6 cents per car.

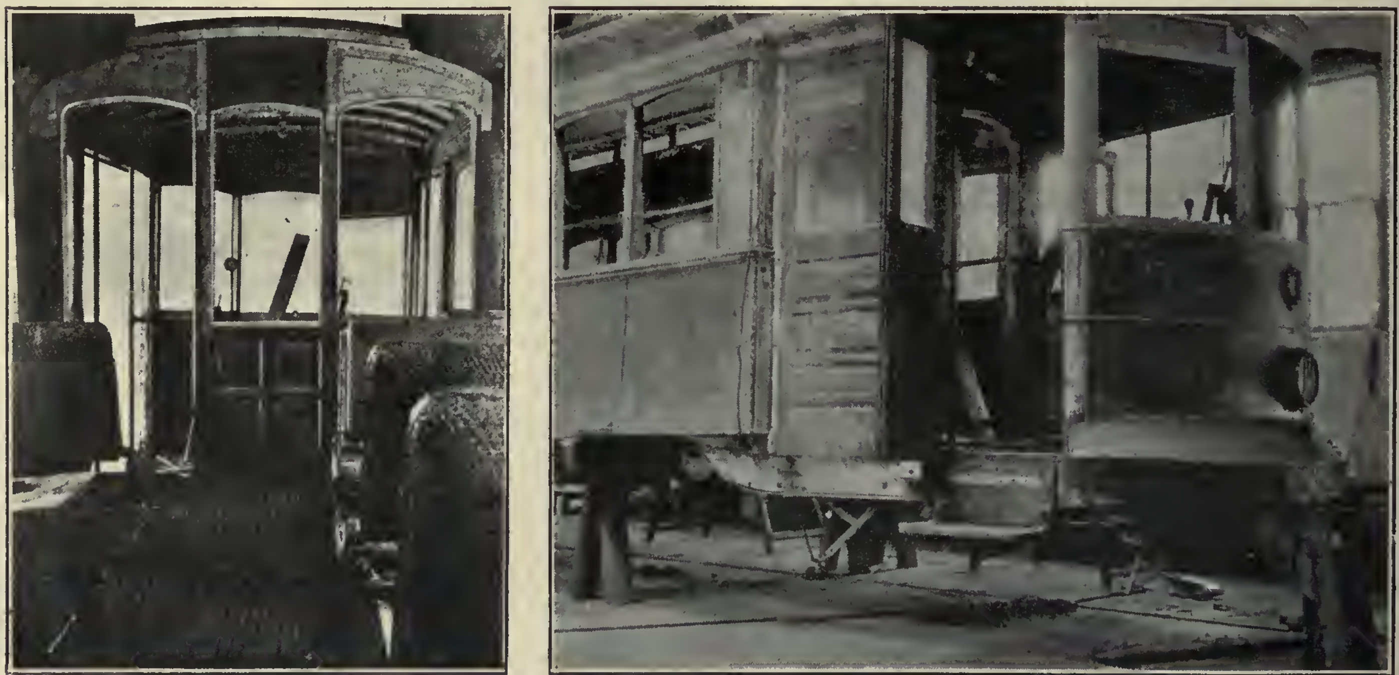
Quickly Adjustable Jig for Journal Bearing

THE Knoxville Railway & Light Company uses a lathe set-up for boring journal bearings, which permits quick and accurate adjustment of the jig.

The jig rests on two iron castings, stretching from side to side of the lathe carriage, and bolted securely thereto. The jig is provided at the bottom with four projecting lugs, two on each side, by means of which it is bolted down on the cross-members just mentioned. It does not clamp down tightly on the cross-members, however, but is drawn by the cap bolts firmly against the flat heads of two special bolts, which screw into



Journal Bearing Jig Used by the Knoxville Railway & Light Company



A Number of These Cars Are Being Extensively Remodeled in Chattanooga. The Bulkhead Could Not Be Removed, but This Treatment Eliminates It for All Practical Purposes bearings bolted to the sides of the cross-members under the end of the jig and in line with its axis. These end supports provide for up-and-down adjustment, while the other bolts allow a rocking adjustment.

The bearing is clamped in the jig by means of four set screws, an operation requiring but a few seconds.

Once adjusted, the jig moves with the lathe carriage in perfect line under the boring bar mounted in the lathe centers.

A Dipping Tank that Is Economical of Varnish

IN THE armature section of the overhauling shop of the Virginia Railway & Power Company, Norfolk, a cylindrical tipping tank for armatures is used that is only slightly larger than the largest armature to be dipped. The tank stands near an electrically heated oven in which the armature is heated previous to dipping and is baked thereafter. Armatures are handled into and out of the dipping tank by means of a jib crane.

Dipping Tank that Closely Fits Armature, Minimizing Amount of Varnish Required

A hinged, gasketed cover held by spring clamps is closed to prevent evaporation when tank is not in use.

Good Fitting Record

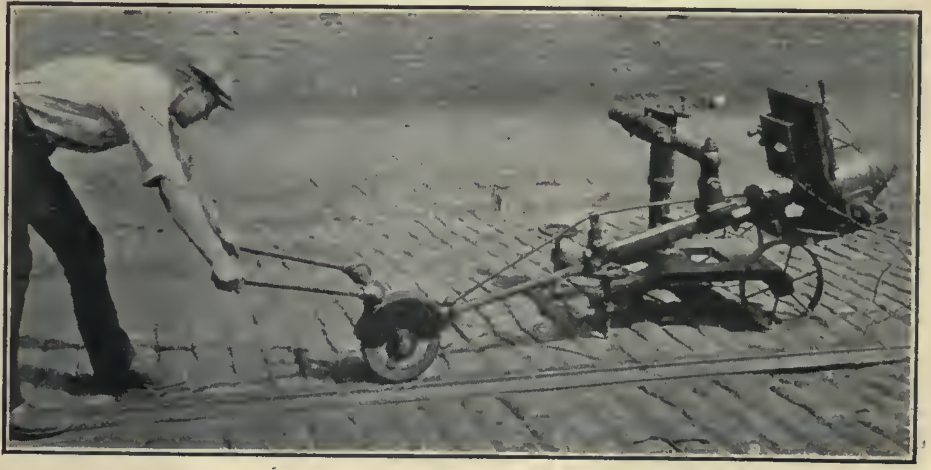
THE mechanical department of the Knoxville Railway & Light Company has a motto to the effect that good fitting keeps down maintenance costs. A recent report from this company states that in twelve years it has not had a loose wheel or gear, and not more than three loose pinions, the result of consistent adherence to this motto.

New Equipment Available

Radial Swing-Frame Track Grinder

A NEW type of portable track grinder has been developed and is being marketed by the Railway Track-Work Company, Philadelphia, Pa., under the trade name of "Hercules." In this design special attention has been given toward developing a light-weight portable grinder, with a permanent shaft connection between the motor and grinding wheel instead of a flexible shaft. The shaft of this new grinder is entirely incased, as are also all moving parts except the lower half of the grinding wheel. By pivoting the entire grinding mechanism from an upright post attached to the frame structure, increased flexibility is obtained. A horizontal arm swings about the vertical support, so as to provide for sidewise movement of the grinding wheel, and the pivoted joint which supports the mechanism makes it easy to raise and lower the grinding wheel without effort as well as to push it back and forth along the track during the grinding operation. This arrangement of joints is also very convenient in transporting the grinder. By releasing the pressure on the two handles, which the operator uses during grinding, the weight of the motor raises the grinding wheel, and by pushing ahead the arm swings about its vertical support, raising the inside end of the truck framework, so that the entire mechanism is readily transported on the two wheels.

The grinding wheel head can be turned completely around by releasing a lock pin on the grinding wheel head, directly in reach of the operator. A 2-hp. compound-wound motor is used for driving, and a switch and control box is mounted in an upright position on the motor frame. "Diamond Brand" grinding wheels are used, and ball bearings are used throughout. The connection from the shaft to the grinding wheel is made through steel beveled gears which are entirely inclosed in an oil-tight gear case packed with transmission grease. The grinding wheel is of 12-in. diameter, 1½-in. face, and operates at 750 r.p.m. The weight of the entire machine complete with motor is 500 lb.


Swing-Frame Track Grinder

Arcing Removed from Controller Contacts

THE Lehigh Valley Transit Company is equipping some of its cars on its Easton division with "No-Arc Drum" controller equipment, manufactured by the Automatic Reclosing Circuit Breaker Company, Columbus, Ohio.

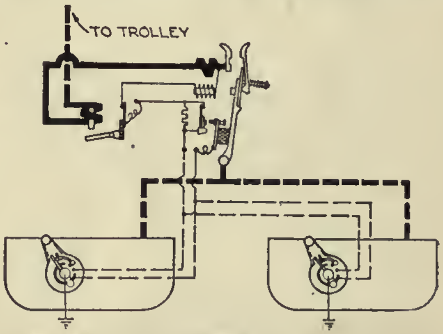


Diagram of Connections for No-Arc Drum Control Equipment

No-arc drum controller equipment can be applied to any of the standard types of platform controllers without changes in them. The new equipment comprises an operating handle and a magnetic contactor with overload relay. The operating handle can be readily attached to the cap plate or top of the drum controller and takes the place of the regular handle. The magnetic contactor is connected in the main operating circuit and may be mounted in any convenient place, preferably underneath the car body.

In addition to providing for moving the controller drum in its regular manner, the operating handle controls the opening and closing of the magnetic contactor. The first movement of the operating handle forward from its "off" position closes the circuit for the magnetic contactor. This closing occurs before the first point of the drum controller is reached. Successive resistance steps are cut out in the regular way by continuing to rotate the controller drum forward by means of the operating handle.

Control Circuit Opened at Contactor

In returning the controller handle to its "off" position, the first movement from any running point opens the control circuit for the magnetic contactor, causing it to open instantly and break the main circuit. Further movement of the operating handle returns the controller drum to the "off" position. The main circuit is thus made and broken by the magnetic contactor and all arcing is removed from the controller fingers and contacts.

The overload relay of the magnetic contactor provides for opening the circuit by dropping out the contactor in case of a short circuit or overload. To reset the circuit breaker it is necessary to return the controller drum to its "off" position, when the overload relay is automatically reset. This equipment also provides for opening the circuit in case of failure of power, so that it provides a safety feature in that it prevents the equipment from being energized upon the return of power as the load cannot be picked up and the contactor closed for operation until the controller is returned to its "off" position.

Accompanying illustrations show the operating handle and magnetic contactor as installed on one of the cars of the Lehigh Valley Transit Company, and an accompanying diagram shows the connections necessary. With double-end control equipment, two wires run from each controller handle and are connected to the magnetic contactor. The first movement of the operating handle closes the circuit for the magnetic contactor. There are, however, two circuits, one a closing circuit and the other a maintaining circuit. With the forward movement of the operating handle, the maintaining circuit is closed and the closing circuit is opened. This maintaining circuit is carried through a maintaining contact on the magnetic contactor, so that the contactor remains closed in any position of the operating handle as long as it is not moved backward toward the off position.

A slight backward movement of the handle, however, opens the maintaining circuit and the contactor opens. Likewise if the overload relay functions the maintaining circuit is broken, and the contactor opens.

The operating handle is of rugged construction, designed for continuous service without excessive wear. The magnetic contactor is of light weight and small dimensions and has ample capacity of current carrying parts for handling the arcing under overload and short circuit conditions.

In Easton this type of equipment has been installed on K-12, K-14 and K-28 controllers on both single and double-truck cars. On double-truck cars the practice of the company is to install the magnetic contactor underneath the center of the car body. On single-truck cars it is installed under one platform. The reduction in controller maintenance is particularly noticeable, as replacement of fingers and segments is comparatively infrequent, and blistered and pitted segments or fingers are done away with.

Controller Handle in Position on Cap Plate

The Magnetic Contactor Is Installed Underneath the Car Body

Two Types of Under-Voltage Relays

TWO types, PQ-25 and PQ-26, of under-voltage relays are being marketed by the General Electric Company, Schenectady, N. Y. These relays are for tripping electrically operated circuit breakers when the voltage has decreased to a certain predetermined value. Motors are thus automatically disconnected on under voltage, thus preventing them from restarting unexpectedly on return of voltage with possible damage to the driving machine.

The relays are of self-resetting plunger type and may be supplied for operation on either direct or alternating current control. Type PQ-25 is for single circuit control, while type PQ-26 is for two-circuit control. The former is made in two forms, instantaneous pick-up and time delay drop-out, or instantaneous pick-up and drop-out. The latter is made in one form only, instantaneous pick-up and drop-out.

The News of the Industry

Arbitration Concluded

Final Arguments in the Boston Elevated Wage Issue Submitted—Vahey Stands for "A Decent Living Wage"

Final arguments have been presented in the Boston Elevated Railway wage arbitration proceedings before George L. Mayberry, the neutral arbiter. Charles W. Mulcahy, counsel and arbiter for the Elevated, submitted his side on Aug. 20 and was followed by James H. Vahey, counsel and arbiter for the men.

Three principal points were emphasized by Mr. Mulcahy as the main questions of the arbitration. The first, he said, was what rate of wages shall be paid to all employees of the company who are members of the union; the second, what differential shall be paid to motormen who operate one-man cars and buses, and, third, how shall the short-hour day be established for work on Sundays and holidays.

Mr. Mulcahy said the Elevated has 6,417 employees; of these 4,089 are blue uniformed men and 2,328 miscellaneous employees. Continuing, he said the Elevated represents an investment of $143,000,000, and is run at cost by public trustees. Fares must meet the cost of service, he pointed out, and if the cost goes up, the fares must go up. If the cost comes down, he went on, the fares will come down.

He declared there is no profit in the operation and that the company is required by the terms of the Public Control act of the Legislature of 1918 to make a fair return on the investment. That, he added, is taken as meaning 5¼ per cent, which is the rent the state pays for the use of the property.

He said that the parties to the arbitration are the organization of employees, the public as represented by the car-riders and the taxpayers. The trustees do not represent the public against the employees. They represent the public as a whole, and the employees are an important part of that public.

Mr. Mulcahy then took up the question what shall be the basis of determining wages. The cost of living is not on a settled basis, he said. In 1921 the trustees took the position that they should follow the cost of living as a basis, said Mr. Mulcahy. "When that cost goes up wages should go up; when it comes down, wages should come down," he declared.

James H. Vahey, for the men, opened his argument by saying that he appreciated the fair treatment of the subject by Mr. Mulcahey. Then he held that present wages are inadequate and should be largely increased, a point which the trustees have already recognized, he declared, by their proposal to raise wages 4 cents an hour and by making various adjustments of wages. Then he gave an outline of the history of the Elevated company.

Mr. Vahey argued that the men are entitled to "a decent living wage," which they are "not receiving now." He said the stockholders are well taken care of by the public control act, which guarantees dividends, but there is nothing in the act protecting the rights of the employees.

United Traction Will Help in Capitol Development

The United Traction Company, Albany, through General Manager Murphy, has pledged its full co-operation in the development of the Capitol District. Mr. Murphy recommended a conference of mayors and other city officials, Chamber of Commerce representatives, railroad, railway and real estate men to work out a practical solution of uniting the cities of the Capitol District in one great city. He said that his company would be "open-minded" in the matter of extensions into proposed newly developed territory. He mentioned several new lines which might be considered prospects for extensions if the industrial and residential development warranted such action.

Discussing the construction of new lines by his company, Mr. Murphy said that paving costs charged at present to the company were exorbitant, and that the company must pay for all paving between the rails and 2 ft. outside of each outer rail. He said that in his opinion this assessment should be eliminated or at least reduced.

Wages Continue for Another Year in Springfield

The Springfield Traction Company, Springfield, Mo., has entered into an agreement with its employees for the period of one year from Aug. 15, 1923, covering wages and working conditions. It is a continuation of last year's agreement.

The schedule of wages in cents per hour for two-man cars is as follows:

First year	42
Second year	44
Third year	45
Thereafter	46

For one-man cars the above rates are increased 4 cents an hour, the maximum being 50 cents. The company is operating 100 per cent one-man cars on all regular runs on its system.

Application Refused

Examiners Recommend Denial of Staley System—Charge Estimated Cost Too Low and Expected Revenues Too High

A recommendation that the application of the Staley System of Electrified Railways for a certificate of public convenience and necessity for the construction of 1,240.5 miles of railroad in Arizona, New Mexico, Colorado and California be denied has been filed with the Interstate Commerce Commission by Attorney Examiner J. H. Agate and E. Gray, engineer-examiner.

The two examiners reported to the commission on Aug. 27 that the applicant had not completed detailed surveys and therefore the estimated cost of construction might be, and probably is, too low; that estimated revenues have been placed too high; that economies estimated to be effected through electrical operation, contrasted with steam, hardly would be as great as estimated, and that the territory proposed to be served is now adequately served by existing transportation facilities.

In the ordinary course of procedure in such cases, the applicant usually files a protest against acceptance of the examiners' report, and a hearing is held before the commission, before that body takes action in the case.

The Southern Pacific and the Atchison, Topeka & Santa Fe Railroads had protested against authority being granted the Staley system for construction of its lines, which it proposed to finance through sales of stock. The California Railroad Commission had reported that there was no lack of transportation facilities in the portion of that state which the Staley system would penetrate.

The Staley system proposed a main line of 745 miles at the Mexican line in Arizona, through New Mexico and into Colorado. It also proposed six branches. It proposed a line in Mexico, not covered by the application, 66.5 miles long, to the Gulf of California, where it was proposed to create a port. Its estimated cost for the 1,307 miles of road, including $6,000,000 for port terminals in Mexico, was $76,024,000; it estimated $30,014,000 for equipment the first year, including $4,000,000 for shops, and estimated an outlay of $26,866,000 for electric power plants and transmission lines.

Coal and coke traffic is counted upon too heavily by the applicant, the examiners assert. They conclude that estimates of revenue traffic have been "greatly exaggerated" by the applicant.

Views Are Aired at Hearing in New Jersey

No Substitute Plan of Constructive Nature Advanced in Place of Company's Proposal for Restoring Service—Municipal Authorities Urge Railway to Resume Operations and Then Talk Terms—Conference Arranged to Discuss Terms

FOLLOWING a hearing on Aug. 20 before the Board of Public Utility Commissioners of New Jersey the controversy there growing out of the strike was referred to a committee representing the municipalities and the bus men and officers of the railway for further discussion. At the hearing opinions were expressed by the representatives of the municipalities and the bus men regarding the plan of settlement advanced by the company, and E. W. Wakelee, vice-president of the railway, further explained the company's stand.

SENTIMENT FOR SETTLEMENT STRONG

The hearing resulted in bringing out the fact that sentiment in the larger cities favored a settlement whereby railway service would be provided. This was extremely desirable, but certain features of the plan presented by the railway were unacceptable. The principal points stressed in opposition to the plan were the acceptance of a valuation figure of $110,000,000 and the operation of buses at a 7-cent fare. Above all, the municipal representatives present were inclined to insist upon the restoration of railway service at once with the discussion of the merits of the provisions of any agreement afterward.

President Osborne of the commission in opening the meeting said that it was held to permit the municipalities to be heard. He asked for criticisms of constructive nature. "We are not here," he said, "to do anything else than make such contribution as we can toward a solution of the problem that confronts the community."

Many municipalities were represented, mostly by their Mayors or other officials. The bus men and the railway employees also had officials present. Mr. Wakelee said there were other propositions to be considered than wages to the men. Since the last meeting the company had submitted its plan of settlement as promised. This plan was intended to bring about a broad solution. It was not dictatorial. The nature of the situation, however. demanded that the plan be considered as a whole. He said that the plan does four principal things:

1. It gives the men a substantial increase in wages.
2. It provides a means whereby the people of New Jersey will get good, adequate, safe service.
3. It provides service at the lowest reasonable rate possible, and also provides the means whereby the rate may be reduced.
4. It provides the means and method whereby new capital may be caused to flow into the business continuously.

"There is no reason," said Mr. Wakelee, "why the people of New Jersey should not be afforded the best transportation in the country." This was indicated in the plan so that he who runs may read.

With regard to the jitney question Mr. Wakelee said that the jitneys were now operating under cover of a state law effective since March, 1921. According to the opinion of the company every transfer of a bus permit to operate was as much a new license as was an original bus operating grant. Great numbers of jitneys were now operated in competition with the trolleys under the guise of "transfers" illegally licensed by the board and many others were operating under transfers of rights that had not even come to the attention of the board. This latter criticism applied to changes in the vehicle operated on a specific license without a transfer of ownership.

So far as the company's plan was concerned Mr. Wakelee said it was an honest plan devised for an honest purpose. It was not the company's plan in that the company got all that it wanted or that the men wanted. All that the company asked was the co-operation of the public officials to create an atmosphere in which the company could live. He then read from the New York *Times* an editorial quotation on a decision by the Maine Utilities Commission, referred to elsewhere in this issue. He said that the stand taken by the Maine Commission against unfair competition reflected the position of his own company. In conclusion he said that he had tried to sketch the situation in its broadest aspects.

CITIES PRESENT THEIR SIDES

Director Raymond speaking for the city of Newark asked if the company were willing to amend the terms of the plan. Mr. Wakelee said he could not say what action would be taken but that he was open to suggestions. Upon this assurance Mr. Raymond stated that the city of Newark wanted to approach the company's plan in a conciliatory way. He suggested that a conference be held between railway and city officials in order to reach an agreement. He said the plan had the appearance of having been put forth in a peremptory way and in a take-it or leave-it attitude. In referring specifically to the tenth paragraph of the plan which states how service may be resumed temporarily Mr. Raymond said that it seemed to him that the company might consent to operate its cars pending a settlement. If the Public Service would consent to a 5-cent bus fare the terms of the plan could be discussed in a conciliatory spirit, but Newark could not discuss a 7-cent basis for buses operated by the railway. He said that he realized the need of the company to get on a sound financial basis.

Assistant Corporation Counsel Brogan of Jersey City said Jersey City wanted to keep as far away from a public service transportation monopoly as possible, but was willing to make a fair settlement. If the company would start the trolleys he was willing to discuss the plan with the company.

In answer to a question about the suggestion that the company be relieved of paving obligations, Mr. Wakelee stated that the company contemplated no change in this respect unless the public desired it. He felt that it was unjust to require the railway to provide paving for others to use. If the public wanted lower fares it should shift some of this burden to the other users of the streets.

Elizabeth wanted the trolleys back, but wanted the jitneys continued in competition with them, said Mr. Griffin. Representatives of that city were willing to sit at a round table discussion with representatives of the company.

Joseph P. Bradley, traffic supervisor of the city of Paterson, stated that the jitneys in that city were handling the transportation situation satisfactorily. The city was opposed to the Public Service plan in its present form.

Mayor Furber of Rahway stated that since the strike his city has had better service than ever before. People could get anywhere in the city. The buses in Rahway were not in competition with the trolley except on one line. "We are taken care of," said Mr. Furber, "and cannot enter into any discussion of the plan."

W. G. Miller, representing West Hoboken, favored the buses being limited to streets parallel to the trolleys. He felt that the present competition was unfair. In his town, with a population of about 40,000, the Public Service had approximately 4 miles of track. In 1922 the railway paid $34,694 to the city as compared with $520 from the buses. In 1921 the corresponding figures were $19,322 and $520, while in 1920 they were $28,556 and $720.

Mr. Moore, representing twenty municipalities in Bergen County, stated that a vote had been taken showing that fourteen towns were in favor of the plan to three against it. The merchants in the territory which he represented were losing business and a vote showed they were keen for a settlement. He asked that Public Service plan be accepted.

E. T. Sharkey of Bayonne said the people in his city wanted the trolleys and also wanted the buses. They were willing. however, to enter into any discussion looking toward a settlement of the matter.

Mayor Loizeaux of Plainfield said that in principle he was in favor of any plan that would eliminate unfair competition with the Public Service Railway. The franchise gave the company rights that should be protected. To permit jitneys to operate on the same route as the trolleys was unfair. In Plainfield there were only two jitneys in operation prior to the strike. He would, however, oppose any plan that would curtail any of the rights of the city incorporated in the old franchises. He thought that the people of Plainfield would stand back of the plan.

Representatives of various other municipalities made statements similar to those expressed above.

Lucius T. Russell, publisher of the Newark *Ledger*, stated that it was necessary to start all over again order to arrive at a settlement. Immediate action was needed now. The prestige of the Public Service would be enhanced ten-fold with the trolleys in operation. Not only did each municipality have a problem different from every other one, but in each municipality there were various individual needs. The entire problem was purely local. It could never be made to spread over the state.

VIEWS OF THE BUS MEN

George L. Record, representing several groups of bus owners, thought the Public Service plan was unworkable and that it was unfair to the bus owners. The jitneys were started in order to fill a need. They accepted the risks of competition. The bus, itself, was not worth much. It was the business the operators had built up that was valuable. The proposition to take over the buses at their physical value depreciated was preposterous. If the trolleys could not operate successfully under the changed economic conditions they should go into the hands of a receiver and be reorganized on a sound basis. The only way out was to adopt a service-at-cost along the lines of the Cleveland plan, provided a start was made with a valuation fair to the public.

George F. Seymour, representing the Essex County bus owners, stated that if a franchise was granted to the bus owners they would put on additional service adequate to carry the people. The bus men would incorporate and buy such buses as were needed. He thought that the Public Utility Commission should prepare a memorandum to the Governor asking him to proceed against the railway by requiring it to live up to its franchise or relinquish its franchise rights.

BUSINESS MEN'S VIEWS

Horace A. Bonnell, president of the Newark Chamber of Commerce, read a statement in which he said that the organization he represented did not believe that either the trolley or the bus alone could meet the requirements of the growing population in Newark and surrounding communities. The two services should be co-ordinated in the interests of the public under one management with efficient regulation. Competition in connection with any public utility under regulation was economically unsound and not in the public interest. The existing crisis could be met only through the orderly process of sound thought and sober action. He filed his statement together with a printed copy of the statement of the board of directors of the Chamber on Aug. 24 in support of the Public Service plan as submitted to the commission. Mr. Moran of the Chamber of Commerce of Camden stated that his organization endorsed the plan with modifications.

TROLLEY MEN ARE REPRESENTED

Harry Jones, representing the 6,000 employees of the railway, believes that more than a question of wages was involved in the settlement. The competition between the cars and the buses was unfair and could not lead to lasting results. What the public wanted was cheaper transportation. The way to get it was to put all modes of transportation under one management and create a natural monopoly. P. J. O'Brien, second vice-president of the Amalgamated Association, referred to the somewhat similar suspensions that had existed previously in Bridgeport, Des Moines, Saginaw and Augusta.

At the request of Chairman Osborne Mr. Wakelee summed up the results of the meeting from the company's standpoint. He said that as a result of the opinions expressed he was impressed more than ever with the need for the railway. The jitneys in particular, he felt, needed the street railway to help them out in their business. He reiterated that the plan advanced by the company was an honest effort to solve a difficult problem. While he was impressed by Commissioner Raymond's idea of service first and talk afterward, the company's position was not what it wanted to do but what it could do. It could not resume without the means of doing so. He thought that the company's plan was the only practical one that had been presented in the course of the discussion.

When Mr. Wakelee had finished the chairman said that it was apparent that the municipalities would not agree to the plan in toto. He wanted quick action and to that end suggested a conference be held immediately between the representatives of the principal municipalities involved and the officers of the railway.

The representatives of the municipalities agreed to comply with this request, but felt that a conference of this kind should contemplate the presence of President Thomas N. McCarter. With this in mind the representatives of the company and the leading municipalities held a conference immediately following the meeting to arrange for a time and place for the conference of these parties.

Trolley Suspension Hurts Business

Sentiment Growing in New Jersey in Favor of Restoration of Railway Service — This Fact Established in Survey "Journal" Editors Made Among Retail Merchants—Company's Plan Generally Approved

THE enthusiasm manifested at first for the auto bus as a substitute for the trolley has waned in the territory where the Public Service Railway formerly operated, and people are gradually becoming more anxious for the restoration of railway service. Up to the present, however, the heaviest burden of the shutdown has been borne by the business men, who have suffered actual financial loss. Personal inquiries made by ELECTRIC RAILWAY JOURNAL editors in several municipalities show that the merchants want the trolley back and are generally favorable to the company's plan of settlement.

The head of a large department store in Newark stated that his business had fallen off 10 or 15 per cent. In his opinion it will be a calamity if trolley service is not resumed, because the bus is not yet sufficiently developed to enable it to replace the street car. He expects conditions to get worse if the shut-down continues, and he approves the company's plan of settlement except the valuation feature.

An official of another Newark department store said that telephone and mail orders had increased, but not enough to balance the loss in "over the counter" trade. Many of his employees are getting to work late. "That fellow on the radio the other night had the right idea," he said, referring to the talk by H. L. Brown, editor of ELECTRIC RAILWAY JOURNAL, which was also published in the JOURNAL of Aug. 18. "The bus has its place, but the trolley and the bus are not interchangeable." He favored the adoption of the company's plan without modification, and expects conditions to get worse in September if the shutdown continues.

A third department store admitted feeling the effects of being without trolley service. "Customers will not come downtown in crowded buses," according to the president of that company. "Any truthful person will say that business has been hurt."

Another large department store claimed to have felt little bad effect so far, but thought that in the long run business will suffer if trolley service is not resumed.

Clothing and haberdashery shops in Newark report their trade to be much affected. One man said his business had fallen off more than 10 per cent. He thinks politics will prevent the adoption of the company plan. A second could give no figures, but said that he had noticed a decrease even though August is ordinarily a dull month. September will hurt more, but a settlement will have to wait until the public is really suffering. Another ascribed the loss of business to the lack of women shoppers on the streets. He would rather pay 15 cents and ride in a trolley than 5 cents to ride in a bus. "Anybody who prefers the jitneys," he said, "would make one of Roosevelt's Rough Riders look like a selling plater." He approves the plan.

A large jewelry store admitted that its business had been badly hit by the shutdown. People may travel by crowded buses to buy the necessities of life, but they will not travel that way to buy jewelry. In spite of decreased business, however, their delivery force has had to be augmented because customers will now carry nothing home themselves. The owner approves the Public Service plan but would like a 5-cent fare in the city.

The children's department of a retail shoe store in Newark might as well be closed, according to the manager. "Nobody brings children downtown now," he said. The plan is all right in his opinion, but politics will block it. A hardware store also reported a loss of trade.

NO MORE READING AS YOU RIDE

"Business is pretty bum," was the way the owner of a news stand in the center of the city expressed his sentiments. "People riding in the jitneys can't read papers," said another, "and anyhow they don't come downtown the way they used to." A barber shop reported business dull before the shutdown and still dull now. The head of the shop hoped for the restoration of trolley service at a 10-cent fare with 5-cent buses.

These statements of fewer people traveling are borne out by traffic checks made in Newark since the shutdown.

The figures show during a 16-hour period approximately 75 per cent of the former passenger traffic on the important arteries. In the rush hour in spite of a 250 per cent load factor the buses are carrying only about 50 per cent of the former rush hour riding.

Restaurants and caterers, on the other hand, appear to be but little affected. One such establishment claimed better business in August than in July. Much of their trade comes by automobile, however. Another said that business was off a little now and would be worse in September. "All sensible people favor the company plan," said the latter, "but there are very few sensible people in Newark."

Newark bank officials interviewed agreed that retail business was being hurt. "The jitney is a failure," said an officer. "Service is worse now than when the trolley shutdown began." At another bank it was said that conditions are really worse than the merchants will admit. Both thought the plan to be fair and reasonable but were afraid that politics would prevent its adoption. A prominent real estate man also favored the plan except in regard to the valuation figure.

Moving picture theaters are feeling the lack of railway service although no definite figures on loss of revenue are obtainable. The manager of a large house in the center of Newark strongly favored the plan of settlement. He criticised the jitney service bitterly. A large vaudeville theater believes it too soon to tell the exact result, but thinks that any disturbance to the transportation system is bad.

In the Centre Market, Newark, merchants appear to be much disturbed about their trade. The manager of one concern there claimed that business is fine, but thinks it may be poor in September. It is rumored, however, that officials in charge of the market do not wish any criticism to be made against the bus service.

The transportation of workers to and from their places of employment is most unsatisfactory in many cases. Only where the factory is located on the outskirts of the city and workers are traveling against the general traffic do they get to work on time.

The Newark Chamber of Commerce says that there is no doubt about business being hurt by the suspension of trolley service. The time has come to endorse some plan of settlement, they think, and the Public Service plan is the best one yet proposed.

In the smaller municipalities there seems to be less trouble than in Newark. Traffic officers in eight or ten towns, with whom the situation was discussed, claim that traffic is less congested now than formerly. A large department store in Paterson said there was no unusual tardiness among their employees.

The bus system has been developed to a greater efficiency in that city, however, than in any other. Routes are short and traffic is heavy, so the buses are making a good profit. The vehicles themselves are mostly new and of a very good type. They are well painted and kept clean inside and out. Prior to the shutdown the buses were carrying about 75 per cent of the local traffic, so they have been pretty well able to handle the situation. The leading store for women's wearing apparel, however, says that business has fallen off, principally because people from the suburbs are not coming in.

Moving picture theaters in Paterson, Passaic, Hackensack and other places claim to have had the best August they have ever had. Probably this may be accounted for to some extent by the unusually cool weather that has prevailed. The manager of a group of ten movie houses said that people in Paterson are touchy about anything that hits the pocketbook. They don't like the idea of a 7-cent bus fare. They ride the present 5-cent buses in preference to the trolleys because they are "sore" at the 8-cent fare. It has seemed unreasonable to them to have to pay 8 cents for a short ride and only 1 cent additional for a transfer which increased the length of ride several miles. In his opinion the fare features of the Public Service settlement plan will prove unacceptable to the public.

Public Service Answers Writ

Company Blames Utility Board for Failure to Provide Revenue and for Bus Competition

The Public Service Railway, through its general counsel, Frank Bergen, filed a return on Aug. 28 to the alternative writ of mandamus issued by the Supreme Court of New Jersey Aug. 17 on motion of the Board of Public Utility Commissioners. The company states that it has not complied with the board's order of Aug. 14 to resume service because of the latter's "unlawful and oppressive conduct" in denying wholly or in part requests made by the company, and also because of the increased wages demanded by its employees. The statement also says that the board's order is illegal and void because it is not in accord with the evidence, and because compliance would take the property for public use without just compensation in violation of the state constitution and of the Fourteenth Amendment of the Constitution of the United States.

The return sketches in considerable detail the history of the company from its inception. It now constitutes a united and complete system of about 850 miles of street railway tracks in 142 municipalities of New Jersey, containing more than 2,000,000 inhabitants. In recent years the system has carried about 1,000,000 passengers a day.

"By the year 1915," states the return, "said street railway system had come to be 100 per cent efficient; that is, as good as new for practical operation, and was regarded by electrical street railway experts as one of the best constructed and equipped urban transportation systems in the country, and more favorably located for expansion than any other, its tracks extending from points on the Hudson River opposite New York, through populous and growing cities and towns, to points on the Delaware River opposite Philadelphia."

The company calls attention to the fact that since June, 1903, it has expended $38,500,000 in extending and improving its street railway system and providing for new equipment. Prior to 1918, it said, the 5-cent fare under conditions prevailing then was regarded as reasonable in spite of hauls for distances as great as 15 miles. In 1917 cost of maintenance and operations began to increase rapidly so that by July, 1921, increase in operating expenses amounted to 119.1 per cent, taxes increased 63.4 per cent and cost of paving more than doubled. By July, 1918, annual expenses had increased by more than $3,000,000.

From 1918 to July, 1921, the company continued to present facts and figures to the board showing the continuing and rapid increases in costs, and asked for increased rates, but "never succeeded in obtaining an increase adequate for that purpose."

Gross earnings, as shown by a table included in the return, increased from

$17,574,867 in 1916 to $26,810,664 in 1920, and since then have remained slightly lower, being $26,353,234 in 1922. Operating expenses and taxes have grown out of proportion to this increase, being $11,219,691 in 1916 and $20,492,478 in 1922. Fixed charges have increased from $4,873,929 in 1916 to $5,316,194 in 1922. The principal operating figures are given in a table, of which the following is an abstract:

Year	Gross Earnings	Total Expenses and Charges	Surplus
1916 ...	$17,574,867	$16,083,800	$1,491,066
1917 ...	18,660,360	17,477,817	1,182,542
1918 ...	19,854,393	20,156,110	301,716*
1919 ...	23,114,605	23,704,604	589,999*
1920 ...	26,810,664	27,554,640	743,975*
1921 ...	26,254,000	26,405,251	151,251*
1922 ...	26,353,234	25,828,578	524,655

*Indicates deficit.

The return states that on failure of the board to approve a new schedule of rates in its order of May 20, 1921, the State Supreme Court ordered a revision of that ruling to provide increased income. The board, "on the fourteenth of July following, in pretended compliance with the judgment of this court, permitted defendant to charge 1 cent additional for a transfer, which would yield to the defendant a sum grossly inadequate to meet its lawful requirements and prevent continued confiscation of its property in serving the public."

According to the return, the operations of the company in the years 1918 to Oct. 19, 1921, resulted in its not being permitted to earn its increased cost of operations in those years by the amount of $13,652,543.

"The effect of the unlawful and oppressive conduct of relator [the board] as aforesaid was: (a) to prevent defendant from earning income sufficient to maintain and operate its property; (b) to diminish its operating efficiency; (c) to take property and service of defendant to the value of $13,600,000 for public use without just, or any, compensation; (d) to destroy the credit of defendant; (e) to cause large deficits to accumulate, and (f) to prevent defendant from protecting its property and business against unjust and unlawful competition. Besides, relator has approved more than 200 licenses for auto buses or jitneys to operate in unlawful competition with defendant, and has for a long time and is now permitting unlicensed auto buses or jitneys to operate unlawfully in competition with defendant."

For the above reasons, combined with the demands of the employees, the company states that it is impossible to comply with the order of the board to operate its cars.

Peter Witt Advocates Rapid Transit Plan for Cleveland

Peter Witt, former street railway commissioner at Cleveland, Ohio, has announced a plan for a rapid transit system for Cleveland. He says he will take steps at once to bring about adoption of the plan, which provides for the following:

1. The construction of three elevated rapid transit lines, serving all parts of the city.

2. The construction by the city of a new bridge across the Cuyahoga River, from Huron-Road to Lorain Avenue.

The entire plan would be worked out in conjunction with the Cleveland Railway, and would augment its system, but not supplant it, Mr. Witt said. The money would be derived from a bond issue. He is reported to have said:

> The question of issuing bonds will be submitted to a vote at the earliest possible moment. But whether or not I am elected I shall go forward with the rapid transit fight.

The rapid transit lines, under Mr. Witt's ideas, would not attempt to take the place of the present street railway in the matter of short hauls. They would feed the present surface system and would be fed by it. Their chief mission would be to take care of long hauls.

Maumee Valley Line Advances Wages

A new wage and working agreement has been signed by officials of the Maumee Valley Railway, Toledo, and the union effective until Jan. 1, 1924. The scale is 53 cents for the first three months in service and 55 cents an hour thereafter. The old scale was 40 cents for the first three months, 42 cents for the succeeding nine months and 45 cents thereafter.

The large increase in the scale is due to the starting of the one-man plan of operation of the new equipment placed in service on the line. General Manager B. A. Webster reports that the company is enjoying a 25 per cent increase in business since it has put the new equipment into service.

The line is a belt operating between Toledo and Maumee and Perrysburg on each side of the Maumee River.

Seattle Employees on Hourly Basis

Over the protest of the Seattle Municipal Railway employees, the City Council of Seattle recently changed the wage payment system for platform men from the monthly basis, under which the men have been working for the last year, to an hourly basis. The new system, which goes into effect Jan. 1, 1924, will give the men a slight increase over their present rate of payment, figured on an hourly basis. The efficiency rating system sought by the trainmen was tabled by the Councilmen, the members holding that if the men are paid by the hour instead of by the month no efficiency rating is necessary.

When the budget comes before the Council for final approval in September the trainmen's union will fight the proposed changes, its business agent announces. No action will be taken in the meantime. The change from a monthly to an hourly basis means that the "one day off in eight" for which the trainmen have been fighting is killed, members of the Council say. If the day off is taken under the hourly scale, it will be at the expense of the men, while under a monthly pay scale they had hoped to be awarded the day off without loss of pay.

The new wage scale will give the men 59.735 cents an hour, 62.5 cents and 65.625, according to their length of service. Under the monthly rate, they received 56.25 cents an hour, 60.41 and 64.58 cents. The change will not effect the total amount granted the street railway department under next year's budget.

Advertising Tells of Improvements.—The Indiana Service Corporation, Fort Wayne, is doing some interesting advertising for the purpose of calling attention to improvements it is making. This advertising consists of car cards reading as follows: "The double tracking on South Calhoun Street costs us $77,000. It will take more than 1,000,000 fares to pay for this work."

Gives Life Insurance Certificates.—The Alabama Power Company has presented the employees of its own company and of the Dixie Construction Company who have been in their service continuously for a period of six months or longer a life insurance certificate in an amount from $500 to $2,500, depending on the length of service, and payable at death to a beneficiary of each employee's own selection or designation.

Picnic in Philadelphia.—The first half of the annual two-day picnic of the Philadelphia Rapid Transit Company was held at Willow Grove Park on Aug. 28 and was attended by thousands of the employees. Thomas E. Mitten, in addressing the gathering, told the men that they would own the property and run it. He finished with a word to a delegation of 100 trolley employees from Buffalo. Messrs. Mitten, Nyman and Dunbar all spoke optimistically in reviewing the conditions of the past year.

Franchise Granted.—The City Council of Vancouver has granted to the Portland Railway, Light & Power Company a new franchise, effective for fifty years. The grant follows a dispute over the proposal to insert a clause relating to the joint usage of poles by the Portland Railway, Light & Power Company and the Northwestern Electric Company, which are competitors for local light and power business. The Portland Railway protested the common usage clause, declaring it would be more of a benefit to the Northwestern concern because the former is new to the field and has fewer poles. The clause was inserted with the understanding that it would not become effective for ten years. Under the new franchise, the city will receive $75 a month from the Portland Railway, Light & Power Company, during the term of its franchise, whereas under the previous franchise the city received nothing.

Financial and Corporate

Valuation Appealed

St. Louis Railway Protests Order of Public Service Commission Fixing Value at $51,781,348

The United Railways of St. Louis has appealed to the St. Louis Circuit Court from an order of the Public Service Commission fixing the valuation of the company for the purpose of rate making at $51,781,348. The petition asked that the court annul the findings of the commission on valuation and to issue a writ of certiorari directing the commission to fix a valuation of $69,100,000 as requested by the company. No order has been made so far.

The city of St. Louis also is dissatisfied with the commission's valuation, holding that it is vastly in excess of the value of company's property. Former City Counselor Henry S. Caulfield, representing the city, filed a certiorari proceeding in the Circuit Court of Cole County asking for an order compelling the commission to reduce its valuation to approximately $29,000,000.

The United Railways in its petition asserts that the commission's order is confiscatory and a Federal question is raised which will enable the company, if it desires, to appeal from a decision of the Missouri Supreme Court, if adverse, to the United States Supreme Court.

Thomas E. Francis, attorney for the company, who filed the certiorari petition, alleges that many of the items in the valuation as fixed by the commission are confiscatory.

The petition quoted from the *Engineering News-Record*, a McGraw-Hill publication, to show that the cost of materials and labor has doubled since 1913. Upon those figures the claim is made that the present fair value of the physical property of the United Railways is $103,645,062.

The value of the United Railways on Jan. 1, 1919, for the purpose of rate making was $69,100,000, the petition alleged.

The petition complains about the valuation fixed by the commission upon a larger number of items making up the total valuation. Among the larger items were overhead construction costs placed by the commission at $5,252,113 and the company at $8,146,877; promoting and financing costs fixed by the commission at $2,700,000 and the company at $5,000,000 and the going value of the company fixed by the commission at $2,500,000 and by the company at $5,000,000.

The company alleged that the commission erred in striking off $15,756,038 for depreciation, contending that $7,500,000 was ample. Complaint is made that the commission disallowed $7,091,415 for unextracted value of the old horse car and other equipment superseded by the present equipment. The disallowance of numerous other items likewise was complained of. While the litigation is pending the 7-cent fare is not likely to be disturbed.

Sun Life Got $30,000,000 for I. T. S. Holdings

It has long been known that the Sun Life Insurance Company, Toronto, Ont., held a very considerable interest in the securities of the Illinois Traction Company. In the deal in which the Studebaker interests became identified with I. T. S. affairs through the medium of the Illinois Power & Light Company the Sun Life Insurance Company is said to have received $30,000,000. The Canadian *Financial Post* says:

> In addition to its usual annual income and its maturing securities, which are in themselves a large sum, the Sun Life this year has an extra $30,000,000, representing the proceeds of the sale of its interest in the Illinois Traction Company. When it received the $30,000,000 cheque for the securities it had held of the Illinois Traction, the Sun Life was handed what is believed to be the largest cheque ever passed in Canada. It probably had also the largest single sum ever ready to be invested at one time in this country.

According to the same authority the Sun company has this year the sum of $70,000,000 to invest.

Receiver in St. Louis Seeking Extension of Bond Maturity

Arrangements are being made by the receiver of the United Railways, St. Louis, to refund or extend $14,800,000 of bonds and receiver's certificates virtually all of which mature Oct. 1. Action is now waiting upon United States District Judge Faris, to whom application for new issues has just been made.

The refunding must primarily take care of the $4,200,000 receiver's certificates now outstanding, which mature Oct. 1. They bear 7 per cent interest. Besides this issue underlying bonds, aggregating $6,100,000, and one junior issue, amounting to $4,500,000, have to be provided for by the same date.

The securities of the Suburban Railway, fall into a different category than the others, because the bondholders started foreclosure suit and may press for a separate receivership. There are two suburban bond issues, the underlying first mortgage issue of $2,000,000, which matured Feb. 1, 1921, and was extended at 8 per cent to Oct. 1, 1923, and the suburban general mortgage 5s, totaling $4,500,000, which matured April 1, last. Besides the separation of the property in the receivership, alternate courses are the redemption of the bonds with funds derived from the sale of receiver's certificates or the extension of the issues with the expectation that the United Railways would be reorganized before the extended maturity date and the bonds taken care of in the reorganization.

Montreal Surplus Increased

Surplus of $347,553 for Year Just Closed Compared with $187,947 for Similar Item for 1922

The fifth annual report of the Montreal Tramways Commission to the city of Montreal for the year ended June 30, 1923, has just been made public. Passenger receipts amounted to $11,752,441, and receipts from all other sources brought the total up to $12,056,355. The allowance made to the company for operating expenses was 25.91 cents per car-mile for motor cars and 18.73 for trailers at a density of 8.5. Last year the allowance was 26.62 and 19.43 respectively for the same density. The allowance granted at this rate was $5,866,155, as compared with $5,832,844 last year. The actual operating expenses and taxes were $6,099,993, or $233,837 in excess of the allowance. Consequently the commission authorized the company to appropriate from the gross receipts the sums necessary to liquidate the excess expenditure. The company has had to pay, over and above the allowances, $93,316 for snow removal, $140,187 for taxes, and $41,460 for injuries and damages, which fully justifies the expenditure in excess of credits.

The operating profit of the company was allowed at ⅛ of 1 per cent on the average value of the capital during the year, and was $48,304, as compared with $47,959 last year. The average value of the capital during the year was $38,643,734, as against $38,367,983 last year.

The maintenance and renewal fund was fixed by the commission at $2,740,778, being at the rate of 11.22 cents per car-mile for motor cars and 9.853 cents for trailers. The actual expense for maintenance and renewal was $2,618,874, leaving a reserve to the credit of the maintenance account of $121,903. Last year the allowance for this account was fixed by the commission at $2,579,200, the actual expenses were $2,368,235, and the amount transferred to reserve was $210,964.

The additions to capital value in the shape of physical assets, during the year ended June 30, amounted to $481,065, and after deducting the value of properties and materials discarded and scrapped, the net addition to capital value amounted to $15,901. Last year the net addition was $269,211.

The following is a statement of operations for the year ended June 30:

	1923	1922
Gross receipts	$12,056,355	$11,712,525
Operating expenses and taxes	6,099,993	5,769,403
Maintenance	2,492,792	2,579,200
Operating profit	48,304	47,959
Interest on capital value	2,344,681	2,329,457
Financing expenses..	181,431	181,431
City's rental	500,000	500,000
Reserve fund	41,597	171,125
Surp'us	$347,553	$187,947

The accompanying statistics will show that the better results anticipated have been realized.

	1923	1922
Revenue, passengers	$193,519,038	$188,201,367
Car-miles	22,318,701	21,547,345
Operating ratio	71.67%	71.69%
Paid to city	1,309,581	947,157
Percentage of gross receipts	10.86	8.32
Average fare	6.23	6.223

The amount paid the city during the past twelve months was made up of $229,629 taxes, $190,800 for snow removal, and $889,151 on rentals. The general statistics of the company show that the length of tracks is now 271,422 miles, of which 253,176 are in operation. The gross receipts per mile of track in operation amounted to $47,620. The operating expenses and taxes consumed 51 per cent of the gross receipts while the maintenance and renewals absorbed 20.67 per cent.

The statistics further show that 79,123,158 transfers were issued, being 40.89 per cent of the number of revenue passengers. The total operating expenses and taxes per passenger amounted to 4.47 cents.

Time Extended Under Reorganization Plan of Chicago "L"

The committee in charge of the reorganization of the Chicago Elevated Railways has notified the holders of the two-year 5 per cent secured gold notes and the ten-year 6 per cent debentures that in order to afford further opportunity for these holders to participate in the benefits of the reorganization plan, dated July 14, 1923, the time for making deposits under this plan and the accompanying agreement has been extended to the close of business on Sept. 25, 1923. More than 92 per cent of the secured gold notes and a substantial percentage of the ten-year 6 per cent debentures have been deposited subject to the plan and agreement of reorganization. Until the close of business on Sept. 25 secured gold notes and ten-year 6 per cent debentures may be deposited with the National City Bank, New York, or with the Continental & Commercial Trust & Savings Bank, Chicago, depositaries of the committee. Upon such deposits the depositaries will issue, in exchange for deposited securities, appropriate certificates of deposit.

William Hughes Clark of Chicago has voiced objection to the reorganization plan of the Chicago Elevated Railways in a letter to noteholders, calling on them to join with him in opposing the plan. He charges that the reorganization plan required "several and unnecessary sacrifices from noteholders."

In a letter to the noteholders he said:

> My examination of the reorganization as planned, discloses the noteholders would be obliged (a) to sacrifice their sole and only claims against the very valuable equity in the prosperous South Side Division; (b) to sacrifice their majority claims against an equity in the Metropolitan Division; (c) to sacrifice their large claims against the Northwestern Division, and (d) to sacrifice their pro rata two-thirds interest in $208,000 Northwestern first mortgage bonds and other assets of the railways trust available to the committee, etc., all mostly for the benefit of particular holders of Oak Park receiver's obligations and Lake Street bonds and selected numbers of other securities.

Bonds Offered Locally.—The Lehigh Traction Company, Hazleton, Pa., recently announced that it would offer to its employees, patrons and the public an opportunity to buy $350,000 of first mortgages bonds on the basis of $89.10 for each $100 bond.

More Power Properties Acquired.—The Puget Sound Power & Light Company, a company under Stone & Webster management, has acquired control of the Olympia Light & Power Company, which supplies electric light and power and street railway service to Olympia, Wash. The acquired company's gross earnings for 1922 were $199,581.

Meeting of Stockholders Called.—A special meeting of the stockholders of the Illinois Power & Light Corporation will be held on Sept. 4, 1923, in Chicago for the purpose of submitting to a vote of the stockholders the question of increasing the authorized capital stock of the corporation by increasing the authorized par amount of the 7 per cent cumulative preferred stock from $20,000 000 to $25,000,000.

Indiana Electric Bonds Offered.—Stone & Webster, Boston, Mass., are offering at 99 and interest to yield about 6.57 per cent $2,700,000 of the Indiana Electric Corporation's first mortgage 6½ per cent gold bonds, series "B." The bonds, due August 1, 1953, are non-callable for ten years. The proceeds will be applied toward the cost of construction of high-tension transmission lines and substations.

Seek Bond Issue.—The Georgia Railway & Power Company, the Georgia Railway & Electric Company and the Atlanta Gas Light Co., operating the street railway and public utilities of Atlanta, has filed a petition with the Georgia Public Service Commission requesting permission to issue bonds in the sum of $74,000, $291,000 and $116,000 respectively, the money to be used largely for service improvements.

Auction Sales in New York.—At the public auction rooms in New York on Aug. 29 there were sold 26¼ shares Interborough Rapid Transit Company voting trust certificates, $13½ per share; $1,000 Interborough Rapid Transit Company ten-year 6 per cent note of 1932, interest April and October, 58¾ per cent; $5,000 Interborough-Metropolitan 4½ per cent bonds, 16 per cent, assessment paid, certificate of deposit $50 lot.

Must Return Bonds.—The city sinking fund trustees at Toledo have been formally requested to return $150,000 of 6 per cent bonds of the Community Traction Company to the Doherty interests, by whom they were placed as a forfeit in connection with the Milner ordinance plan of obtaining $1,000,000 of new capital for extensions and betterments of the Toledo system. The time for request from the city and formulation of a plan expired Aug. 1.

Stabilizing Deficit in Youngstown $963,131.—The deficit to the stabilizing fund of the Youngstown Municipal Railway, Youngstown, Ohio, for June amounted to $35,302. The increase places the stabilizing deficit on July 1 at $963,131. Gross revenues for June amounted to $137,793. Operating expense, maintenance cost and deduction from revenue were $124,772, resulting in a surplus of $16,211, which under the terms of the franchise is entered into the stabilizing fund at the end of each year.

Requests Signing Petition.—The shareholders' protective committee of the Quebec Railway has requested that holders who have not yet signed the petition to the president for modification of the terms of exchange should do so without delay. The committee already has representation of about 50 per cent of the aggregate holdings of individual shareholders. The terms of the merger of the Quebec Railway and Quebec Power Company were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 4.

New Issue to Be Offered.—Greenshields & Company, Mackenzie & Kingman and Aemelius Jarvis & Company will offer, it is expected, at 95, to yield 7⅜ per cent, $550,000 of the 7 per cent cumulative preferred stock of the Jamaica Public Service Company. This offer will complete the financing arranged at the time of the transfer of the property, formerly owned by the West India Electric Company, to the new interests, who are operating it under Stone & Webster management. The first step in the financing was the sale of $1,000,000 of first mortgage bonds of the company.

Invites Bids on Bonds.—The Market Street Railway, San Francisco, Cal., has invited bids for the sale to it on Sept. 1 of a sufficient number of its first consolidated mortgage 5 per cent gold bonds for the investment of $160,000, now in the sinking fund provided for in the mortgage executed by the Market Street Railway to the Union Trust Company, San Francisco, as trustee, under date of July 12, 1894. The lowest bids will be accepted and bonds redeemed to the extent of $160,000. Interest on all bonds accepted under any bid will cease Sept. 1, 1923. Payment for all bonds accepted will be made on surrernder of the bonds after that date.

Gold Bonds Offered.—Stone & Webster are offering at 99 and interest, to yield more than 6½ per cent, $3,807,800 of refunding and improvement mortgage 6½ per cent gold bonds of the Staten Island Edison Corporation. These bonds, dated July 1, 1923, will mature July 1, 1953. The proceeds will be used to retire the floating indebtedness incurred for extensions, additions, new construction and other corporate purposes and to acquire $700,000 par value of underlying bonds which will be deposited with the trustee of this issue as additional security for these bonds. The Staten Island Edison Corporation is successor under reorganization to the Richmond Light & Railroad Company.

Traffic and Transportation

75,000,000 Tickets for Detroit

Mayor Urges Purchase of Tickets at Nine for Fifty Cents as Economy and Move to Speed Traffic

The Department of Street Railways at Detroit has had 75,000,000 tickets printed to be in readiness when the 6-cent fare goes into effect on Sunday, Sept. 2. The tickets will be sold in strips at the rate of nine for 50 cents. It was planned to put them on sale on Aug. 31 at the City Hall, the carhouses and the terminals and to have conductors sell the tickets beginning Sunday.

William B. Mayo, general manager of the system, is urging the public to purchase tickets on the plea of the saving to the passengers by their use and their value in speeding up the movement of cars. Until further notice "tokens," or metal tickets, now in the hands of the public will be accepted the same as a 5-cent piece, but passengers using these tokens beginning Sept. 2 must deposit an extra cent in the fare box. The new rate of fare will also apply to the buses now being operated on Mount Elliott Avenue.

ARBITRATOR VOICES OBJECTION

The decrease in income of the D.S.R., it has been pointed out, bears out the Street Railway Commission's statement that the increase in wages of the employees and increased power charge would have to be met by the increase in fares if the necessary rehabilitation of the lines is to be provided. Despite this considerable opposition has developed to the commission's policy of increasing fares. Judge Dingeman, chairman of the board of arbitration that decided the question as to the increase of wages for the platform men, expressed the opinion that according to the study of the finances of the department, made during the arbitration proceedings, the increase in fares was not necessary. Judge Dingeman stated that the possibility of an increase in fares resulting from an increase in wages of the men was carefully considered by the arbitrators and after analyzing the figures presented, it was the belief of the board that the higher wages granted the men would not necessitate an increase in fares.

Mayor Doremus, it is stated, in agreeing to the increased fare plan depended mainly on the judgment of the commission in regard to this particular point.

A proposed resolution to be introduced in the City Council by Councilman John A. Kronk, requesting the Street Railway Commission to appear before that body and explain why the increase in fares was necessary, was protested against by Ross Schram, assistant general manager. Mr. Schram pointed out that the commission had made a thorough study of the fare question before deciding on an increase, and while the commission was willing at any time to lay its books before the Council, it protested against interference with its management of the D.S.R.

Councilman Kronk favors a straight 5-cent fare with an increase in the cost of transfers sufficient to meet the increase in operating costs due to the recent increase in pay and the higher power costs which became effective on July 1. Mr. Schram says this plan would penalize the car riders living on transfer lines. Mr. Kronk also favors the plan proposed by Mayor Doremus for refinancing the street railway purchase by issuing twenty-year or thirty-year bonds and with the proceeds of the bond sale to pay off the ten-year mortgage on the system. This arrangement, he stated, would provide for the financing of the extensions, additions and betterments each year from the earnings.

Restraining Order Continued in Schenectady

Supreme Court Justice John C. Crapser in a special term of the Supreme Court at Canton, N. Y., on Aug. 25, granted the motion of the attorneys for the Schenectady Railway that the order of Supreme Court Justice Edward N. Angell restraining jitney drivers from operating parallel to the company's lines be continued during the trial of the case. Attorneys representing the jitney men, whose activities are an outgrowth of the Schenectady trolley strike, opposed the motion on the ground that the city of Schenectady licensed the operation of the jitneys.

Company attorneys also made a motion on an order to show cause why the defendants should not be punished for contempt in disobeying the injunction. Justice Crapser interposed with the suggestion that the opposing factions come to an agreement before proceeding. After a conference of attorneys it was agreed with Judge Crapser that an adjournment be taken for one week and that it be understood that counsel for the defendants explain to members of the jitney men's organization the court order and advise them to maintain it.

Increased Service Kills Jitneys.—Cars on the Point Place lines, operated by the Toledo, Ottawa Beach & Northern Railroad, have put three buses that have been in competition for many months out of business by an increase to a fifteen-minute service. The buses quit about two weeks before the new state license law went into effect.

Bus Licenses Denied

Maine Commission Refuses Authorization for Bus Service Since Present Agencies Are Satisfactory

The Maine Public Utilities Commission has just handed down a decision refusing to grant licenses for bus operations over regular routes between Portland and Old Orchard. The bus applications were in competition with a steam railroad, namely, the Boston & Maine, and an electric line, the Cumberland County Power & Light Company. In dismissing the petitions the commission said:

> Competition, which adds life and force and incentive to ordinary industries, cannot truthfully be said to be desirable in the conduct of public utilities, which in their nature, although owned by private individuals, are dedicated to the use of all the citizens of the community. Public utilities must, of necessity, be limited in number in any given community in order to be at all remunerative and hence able to attract capital for maintenance and development.

The commission brought out the fact that at the hearing no complaint was registered against the agencies operating this service. Further, that adequate service was enjoined by statute from all the public utilities of the state, and it had frequently been ordered by the commission against the protests of the utilities that additional service would not be remunerative. According to the evidence brought out at the hearing, the Portland Railroad, which is operated by the Cumberland County Power & Light Company, for the first six months of 1923 failed to earn its operating fixed charges and rental by the amount of $5,253, and it was shown that only from June 1 until after Labor Day is this branch of the service, between Portland and Old Orchard, self-supporting.

The opinion emphasized the fact that this was the acute problem facing electric railways not only in Maine but throughout the United States; that the mere desire of an operator of a motor vehicle to provide himself with lucrative business during the summer season should not be sufficient to place in his hands an agency of destruction of the electric railway system. The problem, this order said, was squarely presented whether or not a regularly organized and operated street railway service conducting its business for seven days a week and twelve months of the year under the control of the commission, and the duty imposed by the state law that its service shall be reasonable, adequate and safe, shall be protected from a competition that exists only during the summer months, and which ceases when the traffic diminishes by the passing from the border of the numerous tourists who make the community their homes during the summer months.

The commission said further that after reflecting upon the consequences of a discontinued realway service it believed that the general welfare of all the people would be benefited by the refusal of certificates for bus operation between these places.

Submits Fare Proposals for Superior

The Duluth-Superior Traction Company has submitted two proposals with a view to ending the present fare controversy in Superior.

They are a fare of 10 cents cash with four riders for 25 cents. Service not less than the present schedule, and with no change in municipal requirements affecting operating conditions and a 10-cent cash fare with five tickets for 30 cents. At present the company is charging a 6-cent fare and sells six tickets for 35 cents.

This proposal was made by the company as the result of a request recently made by city officials. The city commissioners stated that if the company would submit an offer they would be in a better position to give it attention and would doubtless reach an agreement sooner than if the whole subject of fares were made the basis of discussion without any definite program or plan being offered.

Will Experiment with Buses.—The Northern Indiana Railway, South Bend, Ind., will start the operation of motor buses on Sept. 1 as an experiment. The company hopes that the bus service will relieve some of the congestion on Miami and Michigan Streets.

Referendum on Bus System. — By unanimous vote the City Council of Buffalo adopted the recommendation of Frank C. Perkins, Commissioner of Public Affairs, that a referendum be held at the next election in November on a bond issue of $1,000,000 for a municipal bus system.

"Safety Always" Issued.—An instructive as well as unusual booklet entitled "Safety Always" has just been issued by the Philadelphia company. Two charts are printed inside the pamphlet, one showing how "you" can become a member of a good health organization and the other giving nine directions for avoiding accidents. It sums up the whole matter in the phrase "A second's thought may add years to your life."

Bus Replaces Trolley Discontinued by Accident.—The city of Corry, Pa., was deprived of service over the lines of the Corry & Columbus Traction Company on Aug. 27 owing to the burning out of a transformer in the power house. Meanwhile, a bus line has been established to replace the trolley between Corry and Columbus.

Applies for Service Restoration.—The New York Transit Commission has applied to the Supreme Court for a writ of mandamus ordering the subsidiary companies of the Brooklyn-Manhattan Transit Company and the Brooklyn City Railroad to restore service on four surface lines in Brooklyn. Oct. 8 has been set as the date for the argument.

Fare Mounts.—The rate of fare of the Cleveland Railway goes up to straight 5 cents on Sept. 1. Since August, 1922, Cleveland car riders have been riding for a fraction under this rate because tickets were sold at the rate of eleven for 50 cents. The present increase is due to the fact that the company's so-called interest fund, the fare barometer, has dropped below the sum of $300,000, at which point the fare automatically is boosted. The drop in the interest fund is caused by a decrease in the number of car riders during the past several months and a 5-cent an hour wage increase given the trainmen on May 1. A 1-cent charge for transfer will continue.

Another Extension of Fare Grant Proposed.—The committee on streets of the City Council of Richmond, Va., has before it for consideration the ordinance granting an extension of a 6-cent fare privilege to the Virginia Railway & Power Company for a period of six months after Oct. 11, when the present permit expires. There has been considerable agitation to amend the grant by requiring the company to sell tickets at the rate of five for 25 cents, or 6 cents a single fare, and to open its viaducts in the city free to all vehicular traffic. In the event the petition of the company is disregarded by the City Council, the original fare rates will become automatically effective after Oct. 11. The franchises demand a 5-cent straight fare, with six tickets for 25 cents; and labor and school tickets at 2½ cents each.

Legal Notes

FEDERAL COURTS—*Valuation Should Be at Present and Future Values, Not Past Values. Five-and-a-Third per Cent Return Wholly Inadequate. Commission's Responsibility Is to Regulate, Not Manage.*

It is a matter of common knowledge that, in costs of material, labor, supplies, etc., used by public service corporations, there were large increases, between the years 1913, 1914 and 1916, and the year 1919. Under the due process clause of the federal Constitution, the fair return on the property of a public service corporation to which it is entitled, and which must be determined in inquiry as to the reasonableness of regulation of its rates, is the fair return on the reasonable value of the property at the time it is being used for the public and not merely its cost with increases of value excluded. It is impossible to ascertain what will amount to a fair return on properties devoted to public service unless consideration is given to the cost of labor, supplies, etc, at the time the investigation is made, and an honest and intelligent forecast of probable future values, made on a view of all the relevant circumstances, is essential.

Where rates for a telephone company fixed by the public service commission would yield the company 11⅓ per cent of the minimum value of its property, of which 6 per cent concededly should be allowed for depreciation, the remainder, or 5⅓ per cent on the value of the property, is a wholly inadequate return, when the character of the investment and the prevailing interest rates are considered.

While the state may regulate with a view to enforcing reasonable rates and charges, it is not the owner of the property of public utilities companies, and it is not clothed with the general power of management incident to ownership. Hence a public service commission cannot ignore items charged by the utility as operating expenses, unless there is an abuse of discretion by the corporate officers. (State of Missouri ex rel. Southwestern Bell Telephone Co. vs. Public Service Commission of Missouri. 43 Supreme Court Rep., 544.)

GEORGIA—*Property Owner Not Relieved for Liability for Repaving Because He Paid a Part of the Original Cost.*

A company had a contract with a city by which, for a "franchise, easement or right-of-way" on a certain street, it agreed to pay a certain sum for the purpose of widening and grading the street and an additional sum to cover two-thirds of the cost of the paving. These obligations were carried out, but the court held that they did not exempt the company from a subsequent assessment as a property owner for the cost of repaving the street. [Town of Decatur vs. Georgia Railway & Electric Co., 116 Southeast Rep. 645.]

PENNSYLVANIA—*Pedestrian Struck by Car, Deflected from Regular Route Along Intersecting Street, Held Not Contributorily Negligent.*

One struck by a street car while crossing a street, into which it was suddenly deflected by a misplaced switch from its regular and well-known route, held not contributorily negligent in not looking back down the intersecting street, especially where she stopped at the edge of the track. [Heaps vs. Southern Pennsylvania Traction Co., 120 Atlantic Rep. 548.]

WISCONSIN—*Not Responsible for Derailment Due to Auto on Track.*

It is not negligent to operate an electric train at a speed of 50 m.p.h. on a straight track in the open country. It is also not negligent for the motorman of such trains not to anticipate that there will be a collision on a parallel road between an automobile and a truck which will force the automobile onto the track ahead of his train. Hence a passenger injured because such a train was derailed cannot collect damages from the railway company. [Smith vs. Chicago, N. S. & M. R.R., 193 Northwest Rep. 64.]

Personal Items

Mr. McCants Manager Market Street Railway

Melnotte McCants was appointed general manager of the Market Street Railway, San Francisco, Cal., on Aug. 23 by Charles N. Black, president and former general manager. Mr. McCants will take over a portion of the duties previously discharged by Mr. Black. Mr. McCants has been serving in the capacity of assistant to the president. His appointment was confirmed by the board of directors on Mr. Black's recommendation. Mr. McCants was formerly traveling passenger agent for the Southern Railway. He joined the Market Street Railway in 1906.

W. R. Phipps in Meridian

William R. Phipps, whose appointment as general manager of the Meridian Light & Railway Company to succeed H. G. Bonner was announced in the June 16 issue of the ELECTRIC RAILWAY JOURNAL, entered the public utility business in the electric light field as arc lamp trimmer at Paris, Tex. Later he became fireman and oiler and engineer in the electric plant. After doing some construction work with the Electrical Construction Company at Dallas, he went as chief engineer of the Interurban Railway, McAlister, Okla. His other positions included erecting engineer for Allis-Chalmers Company in Texas and Oklahoma, chief engineer of the Consumers Light & Heating Company, Fort Worth, Tex; chief engineer, superintendent, general superintendent and general manager of the Brush Electric Company, Galveston, Tex., and director customer ownership division, securities department, Henry L. Doherty & Company, New York.

Mr. Phipps was born in Paris, Tex., in 1880 and was trained in electrical and mechanical engineering. He belongs to many associations and clubs and is an associate member of the American Institute of Electrical Engineers.

D. C. Green Resigns

D. C. Green, vice-president and general manager of the Fort Smith Light & Traction Company and the Mississippi Valley Power Company, has resigned after nearly seven years as manager of the Fort Smith properties.

It was in the fall of 1916 that Mr. Green, then manager of the Salt Lake division of the Utah Light & Power Company, with offices in Salt Lake City, left that position to take hold of the Fort Smith properties. Before taking the position with the Utah Power & Light Company he was connected with the Byllesby interests for several years at San Diego, Albany and Marchfield, Ore., and Everett, Wash. Mr. Green's birthplace was near Patriot, Ind. He was graduated from Purdue University in electrical engineering in 1908.

It is not known definitely whether Mr. Green will continue in the public utility field or branch out into private business. Robert C. Coffy succeeds him at Fort Smith.

R. C. Coffy Appointed Vice-President at Fort Smith

R. C. Coffy

Robert C. Coffy has been appointed to the office of vice-president and general manager of the Fort Smith Light & Traction Company. He has been manager of the central division of the Oklahoma Gas & Electric Company since January, 1918. Mr. Coffy has been connected with the utility industry since April, 1908, when he obtained employment as a meter record clerk with the Oklahoma Gas & Electric Company at Oklahoma City. In March, 1912, he moved to Tacoma, Wash., becoming general bookkeeper with the Tacoma Gas Company. September of that year saw his appointment as treasurer and auditor of that company. He remained there until March, 1915, when he was transferred to Everett, assuming the managership of the company's property in that town. His next transfer occurred in January, 1918, when he was assigned as manager of the central division of the Oklahoma Gas & Electric Company.

J. F. Cunningham, Jr., G. E. Production Manager

John F. Cunningham, Jr., has been appointed assistant manager of the production department of the Schenectady Works of the General Electric Company. Mr. Cunningham was born in Valley Falls, N. Y. After leaving school he entered the employ of the Hoosick Falls Power & Light Company and served that company for two years, doing power station and line work. In 1901 he entered the employ of the General Electric Company in the armature department. In 1906 he was transferred to the turbine section of the production department as production clerk. He was later transferred to the main section of the production department as contract clerk and still later was made assistant to the production manager, in charge of requisition service. In 1919 he was transferred to the works manager's office in the capacity of special representative.

Editor Low Honored

Fred. R. Low was tendered a dinner on Aug. 29 and presented with a fine silver loving cup by his associates in the Mc-Graw-Hill Company in honor of his thirty-fifth anniversary as editor of *Power*. Mr. Low has not only been considered one of the foremost business papers editors but he has given greatly of his time and energy to the work of the American Society of Mechanical Engineers. As chairman of its committee on power test codes he had a large part in drawing up the boiler code which became the basis of the law not only in the United States but in a number of foreign countries. He is now first vice-president of the society and will presumably be its next president. As such his duties in 1924 will be particularly significant because of the World Power Conference which is to take place during his administration.

Mr. Low's great success as an editor was attributed by James H. McGraw to his ability to harness his vision for service. Mr. McGraw said he was a practical idealist in his field. When Mr. Low was offered the position of editor of *Power* in 1888 he said that he did not know enough to take the position. H. M. Swetland, general manager of the company which then owned *Power*, replied that he expected an editor to be more of a scoop than a reservoir.

Obituary

Oliver T. Harvell, who for the past fourteen years has been connected with the Georgia Railway & Power Company, Atlanta, as a commercial engineer, and who was well known as an engineer in public utility circles of the South, died recently at his home in Atlanta at the age of forty years.

J. Alfred Landry, president of the Lake Charles Railway, Light & Water Works Company, Lake Charles, La., died recently at the age of sixty-four. He had the sticktoitiveness to forge ahead despite difficulties and shortcomings. It was through his untiring efforts that the elective railway became a reality in Lake Charles. At the time of his death he was the controlling factor in all public utilities in Lake Charles.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Ready to Start on Rehabilitation Program in Detroit

The Detroit Street Railway Commission plans to begin work on the program of extensions and rehabilitation of the existing lines of the municipal railway. The improvements include the rebuilding of 13 miles of the old Pingree lines, placing new pavements between the tracks where the present pavement is defective, purchasing 200 new cars and repairing and repainting from eighty to 100 cars monthly instead of the twenty-five to thirty as under the present schedule at the Highland Park shop. These betterments, it is expected, will not only exhaust the additional revenue from the fare increase but will also require the $5,000,000 bonds which were authorized last spring but are yet unsold. A resolution passed by the Council last spring authorized the Comptroller to borrow $1,500,000 for street railway additions and extensions. This amount has been borrowed in anticipation of the sale of the bonds.

Paving Brick Production

Continued steady production of vitrified paving brick indicates a healthy business condition in the industry and continued active brick street and road construction work during the balance of the season. The July statistical report just issued by the National Paving Brick Manufacturers' Association, shows production and shipments keeping pace with those of previous months. Production for July was 30,529,000 and shipments 27,092,000, compared with production during June of 31,105,000 and shipments of 27,251,000. Stock on hand of 78,835,000 brick is reported. July shipments were made into thirty states and Canada, with Ohio leading in consumption, followed by Illinois, Texas, Iowa and Pennsylvania in the order named.

Price of Bayonet Base Lamps

Among the ways mentioned in the June 16 issue of the ELECTRIC RAILWAY JOURNAL to prevent the theft of lamps from electric railway cars was the use of a medium bayonet base. Inquiry has been made by railways concerning the cost of such lamps, and the following comparative price list of screw and bayonet base lamps is therefore published:

Watts	Bulb	Medium Screw Base	Medium Bayonet Base
23	S-17	$0.32	$0.42
36	S-19	0.32	0.42
56	S-21	0.37	0.47
94	S-24½	0.95	1.05

The price of the bayonet base lamp is higher in every case because of the special handling required. Some reduction would be possible, however, if this type lamp were bought in large quantities. These prices are subject to change without notice.

Asphalt-Concrete Favored for Street Railway Paving

At the annual conference of the Asphalt Association held at Denver, Colo., Aug. 21 and 22, asphalt-concrete was favored as the best material for paving, especially alongside street railway tracks. A detailed description was given by the city engineer of the methods used in Los Angeles for this purpose. The asphalt-concrete is laid tight against the rail to which it is bound by asphalt cement, and it is guttered out by a special tool on the gage side of the rail to make way for the wheel flanges. This construction has given perfect satisfaction, it was said, the flexibility of the asphalt-concrete absorbing all the vibration of car traffic without any loosening of the bond between rails and the concrete.

It was pointed out also that concrete is likely to deteriorate in the presence of alkali, on account of the replacement of the lime of the cement by soda, leaving nothing but loose dust where once there was cement. This condition may be remedied in two ways, either by mixing asphalt in the original concrete, which reduces its porosity but makes it less strong, or by giving an asphalt coating to the finished concrete.

No Change in Rail Prices

The United States Steel Corporation has announced that its price for steel rails for delivery up to March 31, 1924, will be the same as that prevailing for shipment up to the end of the current year, namely $43 per ton. It is thought that all other makers of steel rails will follow the example of the Steel Corporation and establish this price for the first quarter of next year.

No orders will be taken, however, for delivery after March 31 next at this price. After that date the price may be increased. The announcement has been made at this time because inquiries and orders for rails to be delivered during the first three months of next year have already been received in considerable volume by the steel companies. Such purchases have already reached a total of more than 400,000 tons. A number of the larger railroads are expected to come into the market in the near future and their requirements may total as much more.

The fact that there will be no immediate change in the price of steel rails does not necessarily mean that there will be no change in the price of other steel products. In the past the price of other products has been advanced while the price of rails was kept the same. It is possible that the same procedure will be followed again and a general higher price level of steel products will result from the abolition of the twelve-hour day.

ELECTRIC RAILWAY MATERIAL PRICES—AUG. 28, 1923

Metals—New York

Copper, electrolytic, cents per lb.	13.927
Lead, cents per lb.	6.75
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.75
Tin Straits, cents per lb.	40.625
Aluminum, 98 to 99 per cent, cents per lb.	25.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.075
Somerset mine run, Boston	2.50
Pittsburgh mine run, Pittsburgh	2.20
Franklin, Ill., screenings, Chicago	1.675
Central, Ill., screenings, Chicago	1.425
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	12–16
Waste, cotton (100 lb. bale), cents per lb.:	
White	11–13.50
Colored	8–13

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.91
White lead (100 lb. keg), cents per lb.	11.375
Turpentine (bbl. lots), per gal.	$0.95
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	17.50
Rubber-covered wire, No. 14, per 1,000 ft.	$7.00
Weatherproof wire base, cents per lb.	18.75

Paving Materials

Paving stone, granite, 4x8x4, f.o.b.	
Chicago, dressed, per sq.yd.	$3.50
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York

Heavy copper, cents per lb.	11.25
Light copper, cents per lb.	9.75
Heavy brass, cents per lb.	5.50
Zinc, old scrap, cents per lb.	4.25
Yellow brass, cents per lb. (heavy)	6.25
Lead, heavy, cents per lb.	5.75
Steel car axles, Chicago, net ton	$17.75
Old car wheels, Chicago, gross ton	19.75
Rails (short), Chicago, gross ton	20.25
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	8.75

British Contract with U. S. Firm

The bid of the United States Steel Products Company for special trackwork in Manchester, England, has been approved by the Town Council. The figure submitted by the American firm was £14,027, while the lowest English bid was £15,465.

Rolling Stock

Northern Indiana Railway, South Bend, Ind., has purchased three buses which will be put into service on Sept. 1.

Detroit Municipal Railway will purchase 200 cars in accordance with the rehabilitation plan recently announced by the Street Railway Commission.

Interborough Rapid Transit Company, New York, N. Y., has been ordered by the Transit Commission to purchase 100 steel cars right away and 150 more as soon as the Board of Estimate provides additional yard space.

United Railways, St. Louis, Mo., will build sixty new cars at a cost of $600,000 this year and forty early next year at a cost of $400,000. This is in accordance with authorization recently given by United States Judge Faris to Rolla Wells, receiver for the company, to spend $1,218,806 during the balance of 1923 for construction, reconstruction, repairs and maintenance of the company's property.

Monongahela-West Penn Public Service Company, Fairmont, W. Va., will put in operation shortly the seventeen new city cars which were ordered in February of the present year from the Cincinnati Car Company and which cost approximately $11,000 each. These cars are equipped with all safety devices and have a seating capacity of forty-eight passengers. The cars are to be pay-as-you-enter, with the motorman collecting the fares.

Track and Roadway

Southern Public Utilities Company, Charlotte, N. C., has just rebuilt its Pegram Street line at Belmont Park.

Philadelphia & Easton Transit Company, Doylestown, Pa., has been ordered by the Common Council of Doylestown to co-operate with the borough and state in rebuilding North Main Street.

Madison Railways, Madison, Wis., will begin work soon on laying new track on Breeze Terrace from University Avenue to Regent Street. Provision will also be made for double tracking this street.

Southern Indiana Gas & Electric Company, Evansville, Ind., is planning to extend the Washington Avenue street car line from its present terminus to the Bosse High School. The construction of this extension will not be made before early spring.

Kitchener, Ont.—The Kitchener Light Commission and a committee of the Waterloo Council have reached an agreement regarding the double-tracking of the railway line between Union Street and William Street in the town of Kitchener.

New York, N. Y.—The Transit Commission has received bids for necessary alterations in the structure of the Fourteenth Street-Eastern subway line in Bushwick Avenue, Brooklyn, to provide for the installation of a crossover to facilitate the turning of trains when the line is placed in operation next year. The lowest bid, which has not yet been checked by the engineers acting for the commission was that of David Levy for $47,148.

Power Houses, Shops and Buildings

Milwaukee Northern Railway, Sheboygan, Wis., will erect a new passenger depot and freight yards with suitable trackage for storage and handling cars and freight on Jefferson Avenue.

Los Angeles Railway has installed new equipment consisting of transformers and switches in the Sentous Street substation to meet the needs and demands of the new division four administration building.

Arkansas Central Power Company, Little Rock, Ark., will improve its system, spending approximately $550,000. Two new substations will be built, costing $100,000. These substations will be of the automatic kind for the redistribution of power and light and for electric railway current.

Detroit Edison Compay has ordered from the Westinghouse Electric & Manufacturing Company seven 1,000-kw., 60-cycle railway converters with single-phase 23,000-volt transformers and automatic switching equipment, to be installed in seven new substations along the line of the Port Huron division of the Detroit United Railways. The Detroit Edison Company is changing the 25-cycle transmission line supplying this railway to 60 cycles and instead of reconstructing the old substations it was decided to build entirely new ones for complete automatic operation. The substation equipment will not include high-tension oil circuit breakers, but three single-phase transformers will be connected to the transmission line through high-tension expulsion type fuses. The fusing of power transformers for supplying industrial service is the general practice of the company. The new stations will be built of sheet steel on steel framing.

Trade Notes

Breda Locomotive & Car Works Company, Milan, Italy, is completing forty street railway cars for the Lima (Peru) Tramways. Electrical equipment is being supplied by the Tecnomasio Italiano Company of Milan and the airbrake apparatus by the Italian Westinghouse Brake Company, of Turin. The cars are of composite steel and wood construction, with plain arch roof, and are of knock-down type.

Texas Creosoting Company, Orange, Texas, was organized on Aug. 1, 1923, by R. S. Manley and associates. Mr. Manley was formerly president of the Creosoted Materials Company of New Orleans. D. E. Roach, formerly secretary-treasurer of the Creosoted Materials Company is secretary-treasurer of the new organization. The creosoting plant, which will be modern in every respect, will consist of two cylinders 90 in. in diameter and 120 ft. long. The estimated annual capacity under ordinary conditions is 30,000,000 ft., which will include railway cross-ties, piles, poles, cross-arms and timber of all kinds. The plant will be located on tidewater, with facilities for shipment by rail or water. It is understood that actual construction work will start immediately and that the plant will be ready for operation early in 1924.

Heine Boiler Company, St. Louis, announces the following changes in the sales organization. George F. Murphy, who has completed the reorganization of the New York office, has taken charge of the Philadelphia territory, with headquarters in the Pennsylvania Building. Harold P. Childs, formerly special representative of the executive offices of the General Electric Company, has become associated with the company as manager of the New York office, with headquarters at 11 Broadway. J. R. Fortune, formerly manager of the Detroit office, has assumed charge of the territories heretofore covered by Pittsburgh, Cleveland and Detroit offices, and will maintain offices in the Dime Bank Building, Detroit, and in the Park Building, Pittsburgh. These changes became effective on Aug. 1. The company also announces the discontinuance of its Cleveland office.

New Advertising Literature

C. L. Downey Company, manufacturer of "Steel-Strong" coin-counting machines, has issued an interesting and extensively illustrated catalog describing its product. The Cleveland Fare Box Company of Cleveland is distributor to street railways.

Nichols-Lintern Company, Cleveland, Ohio, has issued a bulletin descriptive of its new N-L stoplight signal for electric railways. The company has also issued a new catalog, "Superior Ventilation," fully describing N-L ventilators for electric railway cars and motor buses.

General Electric Company, Schenectady, N. Y., has described in Bulletin 47,635 types PQ-25 and PQ-26 under voltage relays, which provide adequate protection of apparatus from damage caused by sudden return of supply voltage after its failure or reduction. The relays are of the self-resetting plunger type and may be supplied for operation on either direct or alternating-current control Type PQ-25 is for single-circuit control while type PQ-26 is for two-circuit control.

Another Lease of Life!

What would you think of a piece of equipment which served throughout the strenuous life of a car of the vintage of 1900, and is found to be in perfect operating condition today, when the otherwise obsolete car is ready for the scrap heap?

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generally outlast the car itself

Many a sale of new Peacock Brakes for modern cars has been lost by us because the railway company has found the Peacock Brakes on their discarded cars are good for another term of service. Many a new car has gone out on the road the last year or two, with Peacock Brakes made many years ago.

We hate to lose those sales, but we're glad to point out the moral—that it pays handsomely to install the best. It pays in lower maintenance and it pays in longer life. It will pay you now to discard the obsolete, inadequate hand-brakes, which cost so much to maintain.

Peacock Brakes are known as the ones which save their initial cost many times over.

Investigate the economies of Peacock Brakes for your new cars and the ones you are rebuilding.

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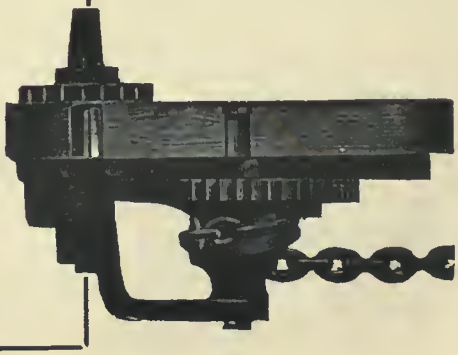

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NEW YORK DETECTIVES BOSTON

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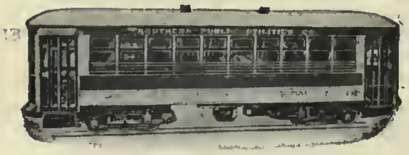
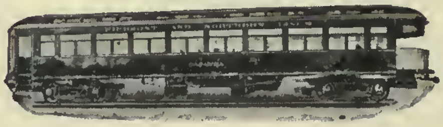
Our Cars Cost Less To Maintain

Safety First





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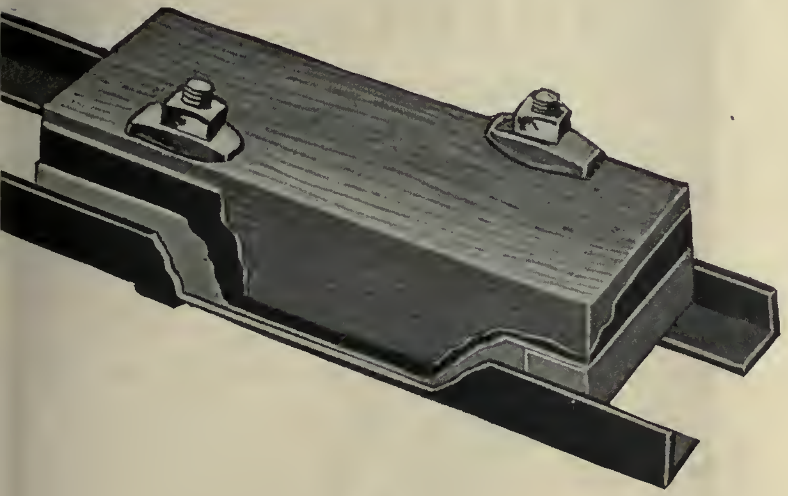
The first cost of track laid on Dayton Resilient Ties is $6,000 per mile cheaper than that laid on wood ties on concrete foundation and $2,000 per mile cheaper than that laid on wood ties on gravel ballast.



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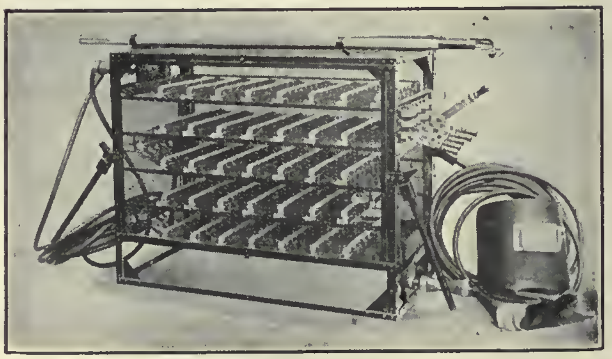

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Reciprocating Track Grinder

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The Reciprocating Track Grinder provides the quickest and cheapest means of removing corrugations. It employs grinding blocks which shape themselves to fit the rail head. They preserve the original shape of the head.

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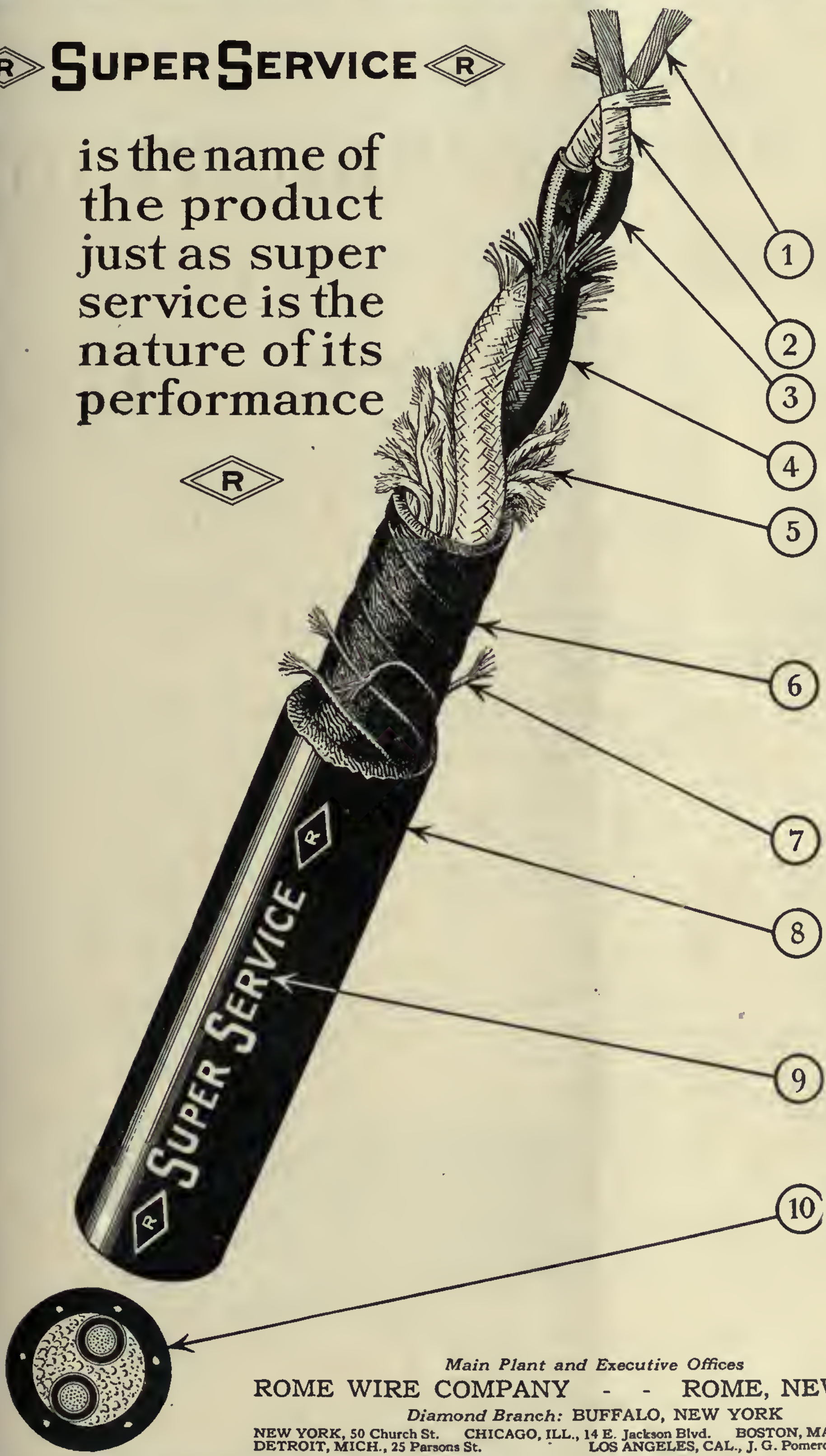
◇R◇ SUPER SERVICE ◇R◇

is the name of
the product
just as super
service is the
nature of its
performance

◇R◇



◇R◇ SUPER SERVICE ◇R◇
CORD CONSTRUCTION

1. Each conductor built up of very fine, soft drawn annealed copper wires, free from splices, scales and other imperfections. Rope stranding of the individual wires insures maximum flexibility.

2. A close wound cotton thread, evenly applied, separates the conductor from the first rubber coating.

3. Srtandard code thickness of 30% high grade selected rubber forms a tough elastic insulation which adheres closely to the cotton separator.

4. The rubber insulation on the indivudial conductors is protected with a closely woven braid, each having a distinctive color to show polarity.

5. Strong Cotton Reinforcing Cords which separate and cushion the conductors and keep the wire perfectly round. Soft and shock absorbing, they add greatly to the tensile strength of the wire without affecting its flexibility. They protect against strains and elongation of the copper conductors, insuring long, uninterrupted service.

6. The first layer of 60% "SUPERSERVICE" Rubber, a tough resilient high grade tire stock. In our vulcanizing process under pressure, it grips fast the braided covering of the individual conductors and the cotton filler threads. This resists twists and kinks, making the wire lie flat.

7. A series of strong, spirally wound seine twine Cotton Cords laid over the first rubber jacket. They add to tensile strength, oppose kinking, and aid the naturally tough rubber to resist stripping.

8. Over all, the big, heavy, outside jacket of that same 60% Super Service Rubber. The whole cord is then vulcanized in steel moulds under tons of pressure, curing at the proper temperature for just the right period, making the rubber dense and tough; yet smooth and supple—resisting oil, water, acid—non-kinking, non-cutting, non-wearing.

9. At the same time there is molded into the rubber every twenty feet, the name of this cord: ◇SUPER SERVICE◇ .—feel for it—it is your safeguard of identification—it means super service in fact as well as in name. Remember, every foot of Super Service is twice hand inspected.

10. The conductors, insulation, reinforcing, and outer jackets are always absolutely centered. Cut a length of Super Service anywhere, and see how accurate is this centering—no thin spots to break down in use.

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August, 1923, Edition

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with NEW FEATURES

New Listing of Holding Companies
(cross indexed)

New indexing to show what lines connect any cities or towns in which you are likely to be interested.

New data regarding number of buses owned.

List of bus lines controlled by electric railways.

plus

1. A complete list showing the correct name of every recorded electric railway company in the United States, Canada, Mexico and the West Indies, arranged by States and Cities.
2. Address of each company.
3. Names of affiliated and controlling corporations.
4. Names of principal communities on routes.
5. Names and addresses of corporation officers and principal department heads, including purchasing agents.
6. Names and addresses of holding or controlling companies and lists of properties controlled by each.
7. Names and addresses of consulting engineers, if any.
8. Addresses of power plants and repair shops.
9. Number and make of generators, starting capacity, voltage, whether d.c. or a.c., and if a.c., phase and cycles.
10. If water power is used, horsepower and make of prime movers.
11. If steam power is used, horsepower and make of boilers and engines.
12. If gas or oil engines are used, horsepower and make.
13. Transmission voltage.
14. Trolley voltage.
15. If energy is purchased, from whom.
16. Number and capacity of sub-stations, number of rotary converters and motor generator sets used.
17. Amusement parks reached, whether owned or controlled by company.
18. Mileage of the road, owned, leased and trackage rights.
19. Miles in paved streets.
20. Gage of track.
21. Number and kind of rolling stock used.

*22. Number of one-man cars.

*23. Rate of fares.

24. Doing a lighting business.
25. Date of latest information.
26. Names, officers and executive committees of Electrical Railway Associations, arranged alphabetically by name.
27. Names, commissioners and principal assistants of National and State Railroad and Public Utility Commissions, arranged alphabetically by States.
28. Statistics showing growth of the industry.
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They Meet All Requirements

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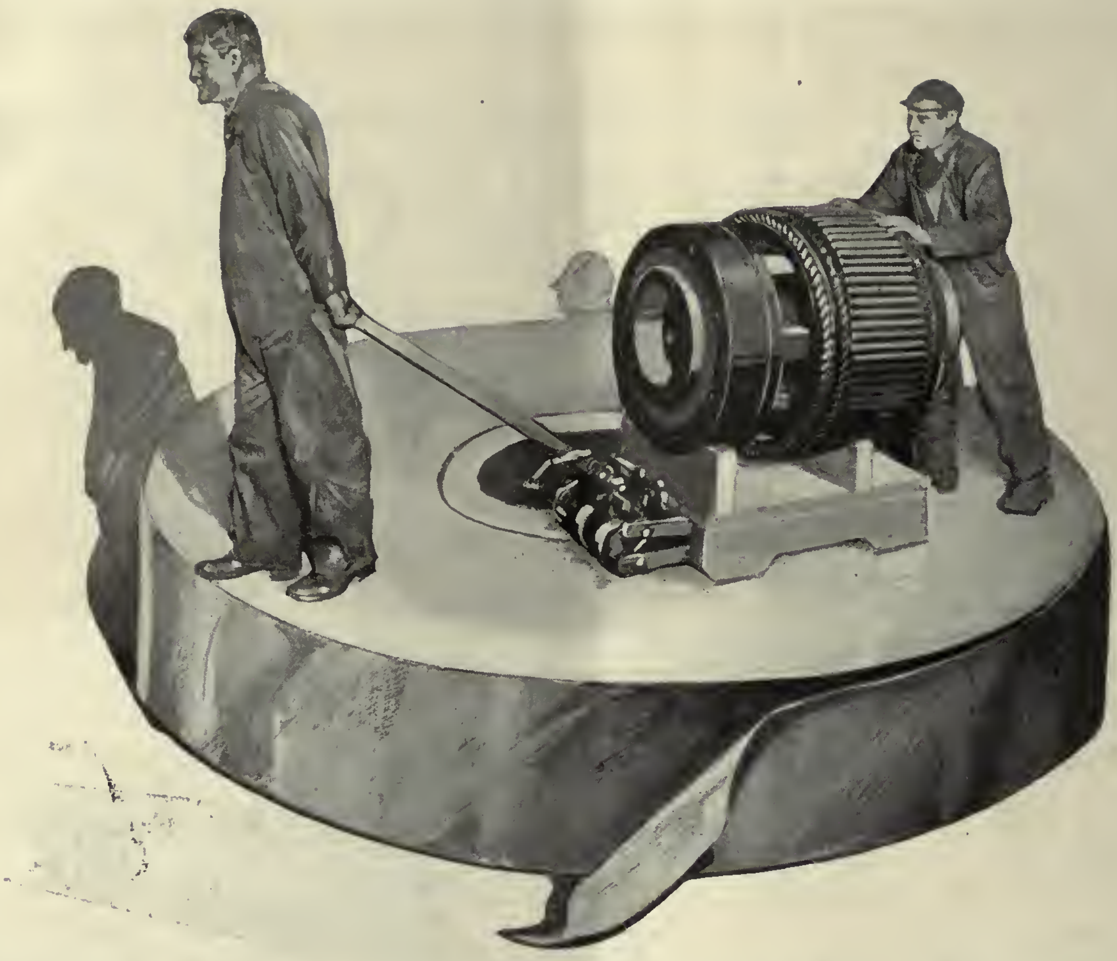

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Chemically Neutral
Maximum Elasticity

Left: Portable De Laval Transformer Oil Purifier at Calumet Station, and, at right, the De Laval Purifier used to maintain the efficiency of turbine oil.

Turbine and transformer oils at Calumet are kept clean and dry with De Laval Purifiers

The oil used in both the turbine units and transformers installed at the Calumet Station of the Commonwealth Edison Company, Chicago, is kept free from water and sludge by means of De Laval Oil Purifiers. Previous experience in their other stations had demonstrated to Commonwealth officials the efficiency and economy of these machines, and so they have been on the job ever since the station was put into operation.

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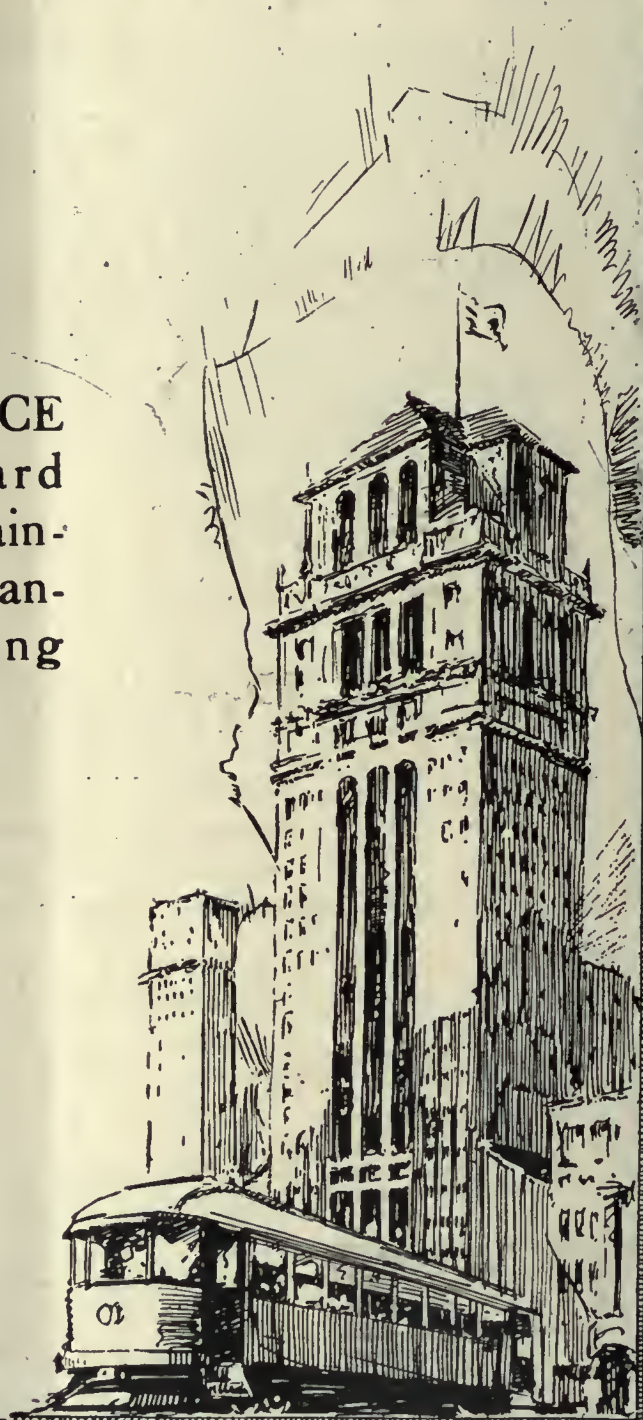

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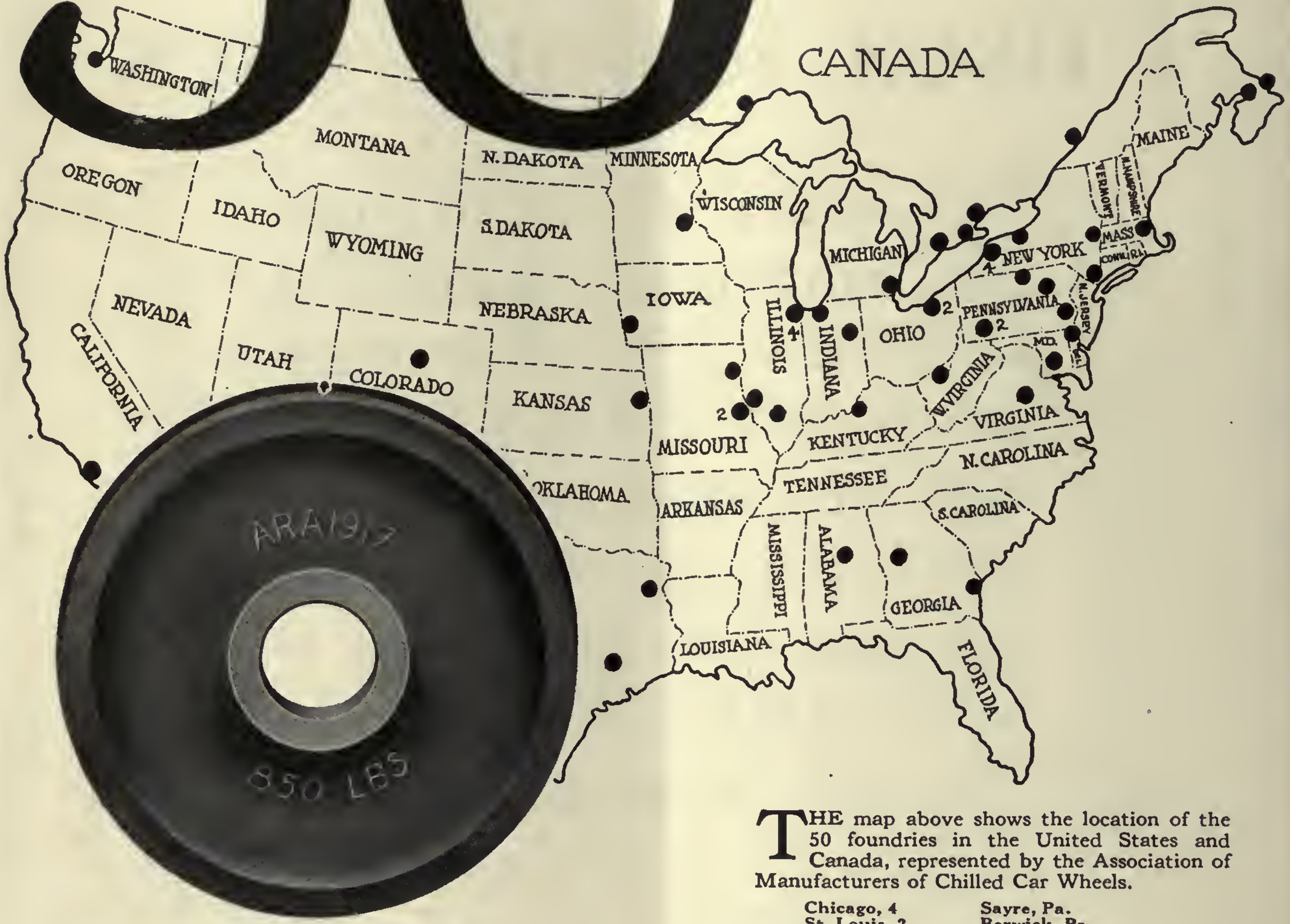

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Ft. Wayne, Ind.
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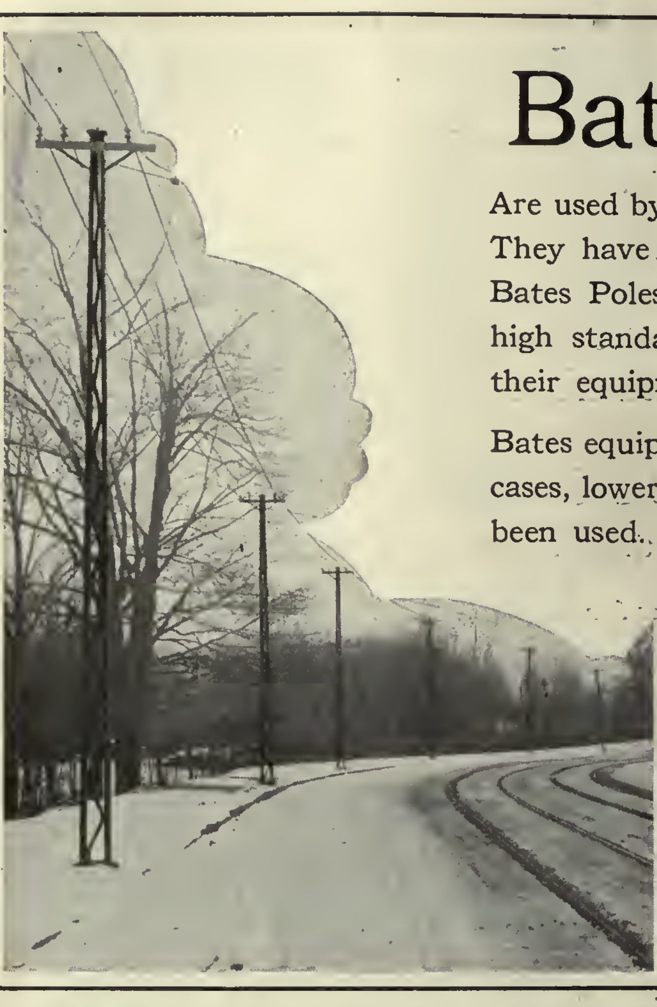

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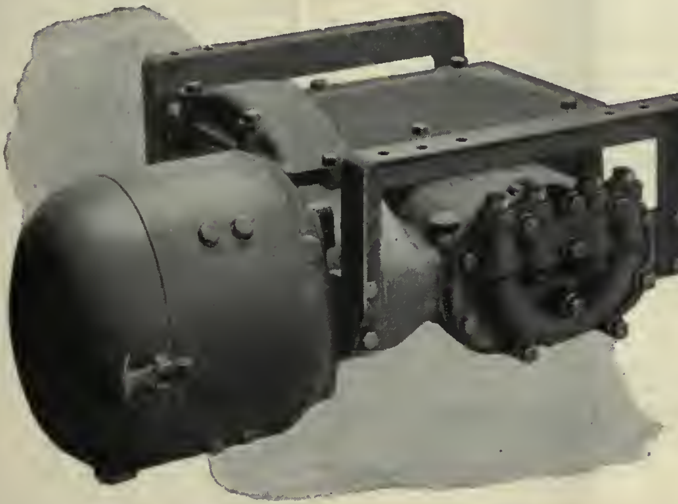

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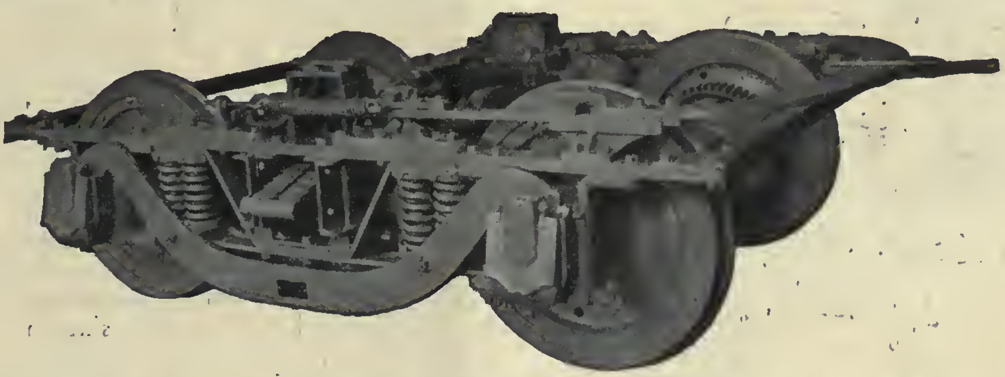

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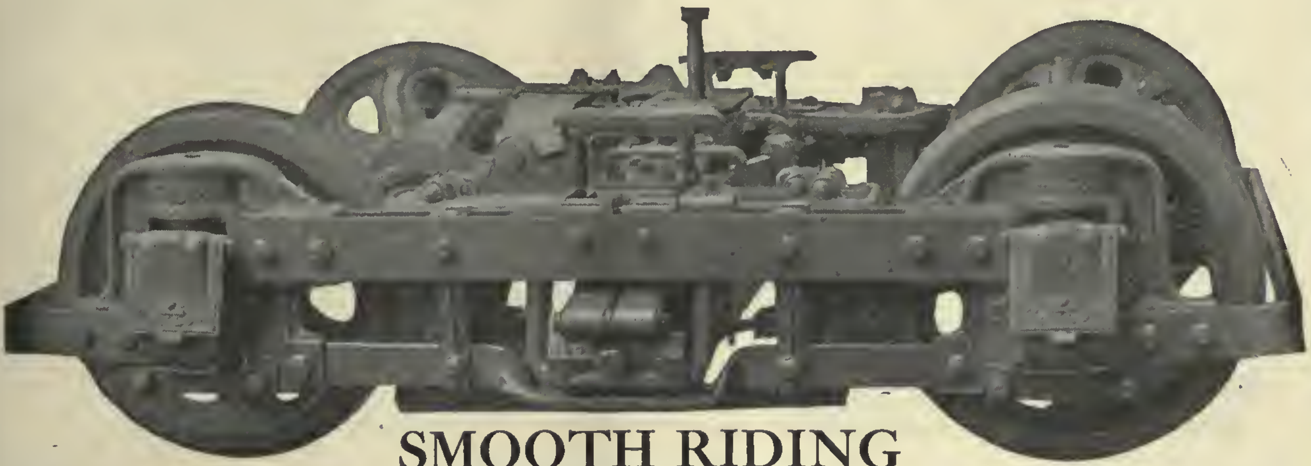

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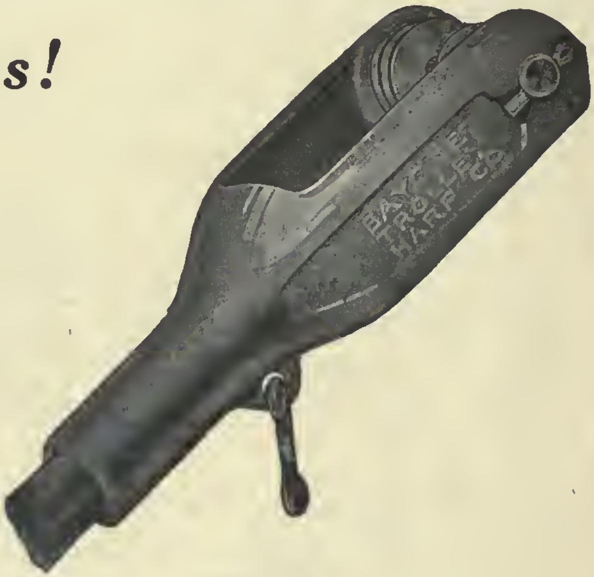

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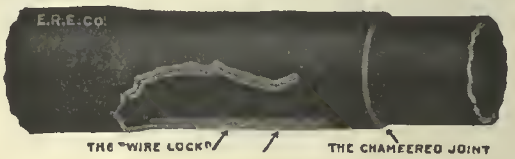

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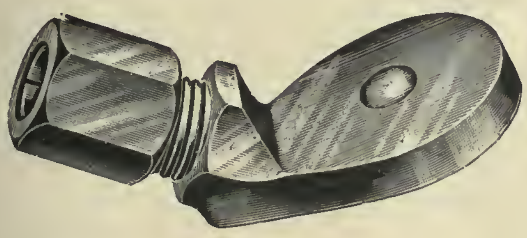

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Dossert Angle Lugs

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TWIN TERMINAL
SOLDER
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Arc Weld and Flame Weld

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Frogs, Crossings, Switches and Mates
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REG. U.S. PAT. OFF.
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for single track block signal protection
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Progressive Inspection of Cars, Rails, Track Fastenings, etc., from the raw material to the finished product. Our Bulletin No. 26 tells the story—*write for your copy.*
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Special Trackwork
For Street and Steam Railways
Steel Castings Gas Cylinders
ORIGINATORS OF
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Series Type
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Rugged series resistance coil
Indestructible Mica insulation
Normal welding current at half voltage
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Special Track Equipment and Layouts of all kinds
THE BUDA COMPANY
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Ramapo Automatic Return Switch Stands for Passing Sidings
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High-grade R. R. Track and Car Jacks
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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. .CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
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An automatic dump car, an electric locomotive, a snow plow, and a freight car—all in one. Big savings shown in track construction and maintenance, paving work, coal hauling, ash disposal, snow removal, and freight transportation.

The Differential Steel Car Co.
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If you desire an agency or sales connection, use these columns.

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

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One-Piece Gear Cases
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Best for Service—Durability and Economy. *Write Us.*
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Jersey City, N. J.

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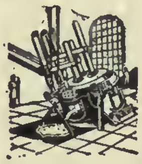

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Largest Maker of Arc Furnaces in the World
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General Sales Agents

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CAR SEATS
of pressed Steel for all Classes of Passenger Service. Rattan for covering seats and for snow sweepers.
HEYWOOD-WAKEFIELD CO.
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Offices at New York, Chicago, San Francisco

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition

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Bemis Trucks	Manganese Brake Heads
Case Hardened Brake Pins	Manganese Transom Plates
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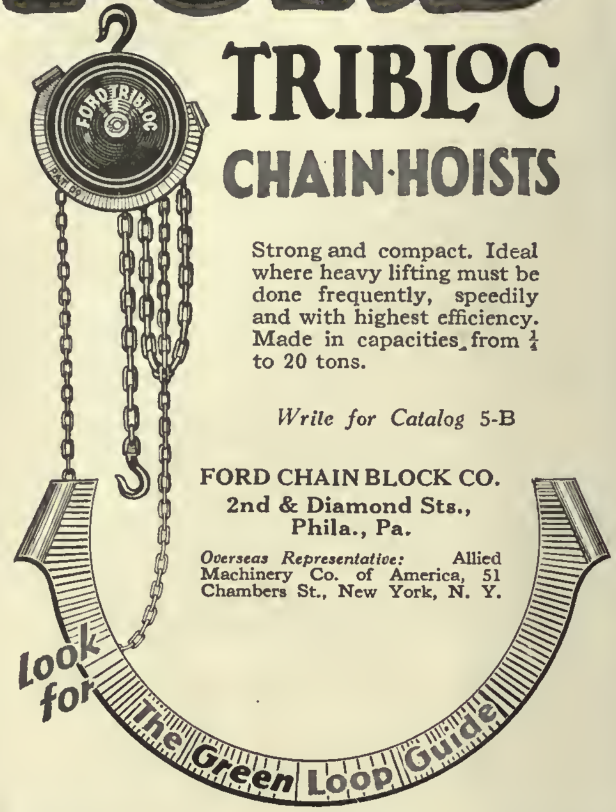
Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardener pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.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TRIBLOC CHAIN·HOISTS

Strong and compact. Ideal where heavy lifting must be done frequently, speedily and with highest efficiency. Made in capacities from ¼ to 20 tons.

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Overseas Representative: Allied Machinery Co. of America, 51 Chambers St., New York, N. Y.

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100 Detachable Five Cent Fare Coupons
SERIES 1923

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Selling Globe Tickets in books to school children encourages the riding habit among them, and builds business for you.

Children buy tickets for the whole term, and pay for them now. You have the money to use now, and you know the rides will not be used for months to come. In printing Globe Books every precaution is taken for your protection against fraudulent use of tickets.

Sell some Globe Books to the children in your locality, and check up on results.

GLOBE TICKET COMPANY
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Los Angeles New York San Franscisco

REG. U.S. PAT. OFF.
TRADE
HOPE
MARK
MADE IN U.S.A.

The

Standard of Quality

The precise and delicate requirements of manufacturers of dynamos, magnetos and other electrical apparatus prescribe the use of electric tape that is known to be of constant high quality.

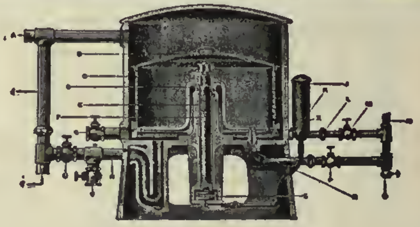
Quality is the sum total of good basic materials and careful manufacture—the best grades of yarn plus painstaking, skilled workmanship.

That is why thickness, width, weave, finish and absorption are uniformly correct in HOPE tapes. That is why, for 40 years, manufacturers of electrical apparatus have found HOPE products to be the Standard of Quality.

Let us send you the HOPE Sample Booklet of electric tape, so that you can pick out a tape to meet your own special requirements.

HOPE Electric Tape

HOPE WEBBING COMPANY, INC.
PROVIDENCE - RHODE ISLAND
New York Troy Chicago



Don't throw the oily waste away!

Save Money By Reclaiming It!

This oil extracting machine is reclaiming hundreds of gallons of perfectly good lubricating oil and many pounds of waste for the Milwaukee Electric Railway & Light Co. as well as many other companies. It will do the same for you. It is widely used as a real economy producing equipment.

Write for full details

OIL & WASTE SAVING MACHINE CO.
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Use only Awebco Tape on your Armatures

Field Coils have better protection when wound with "AWEBCO Tape." Send for samples.

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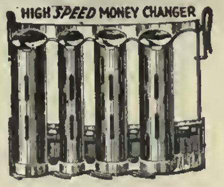
HIGH SPEED MONEY CHANGERS

1923 model —without rivets— ready for delivery



Supplied in one or four tube Combinations

Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Traction Companies because conductors demand them.

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Exclusive Manufacturer's Selling Agent

Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its **ENDURANCE and ECONOMY.**

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

Fare Boxes *Change Carriers*

COIN

COUNTERS SORTERS WRAPPERS

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CLEVELAND, OHIO
Canadian Branch, Preston, Ontario.

HALE & KILBURN
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For Every Class of Service

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Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

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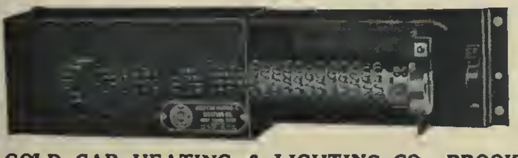

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GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

International Fare Registers

Type R-10
Single Register

Safeguard your Revenue

by a simple and accurate registration, that is the least trouble for the conductor to operate, and for the accounting department to base its records upon.

Our extensive experience in matters of fare collection and accounting is at the command of street railways in solving all problems of fare collection and registration.

The Type R-10 single register illustrated, either hand or foot operation, is also arranged for electric operation.

The International Register Co.
15 South Throop Street, Chicago, Illinois
General Selling Agents for HEEREN Enamel Badges

BECAUSE of its better protective qualities, Dixon's Silica-Graphite Paint makes frequent repainting unnecessary and so gives better protection at lower cost. It is a natural combination of flake silica-graphite. The vehicle is best boiled linseed oil. It will not peel, crack or flake off because of the natural elasticity of flake graphite, while the silica is an anchor that withstands wear.
Write for Booklet No. 180-B

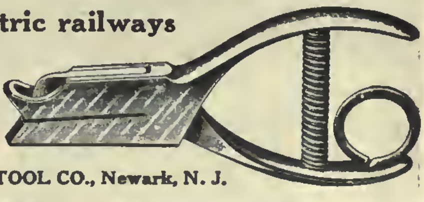
Joseph Dixon Crucible Co.
Jersey City, N. J.
Established 1827

TRADE D X N MARK

DIXON'S Silica-Graphite PAINT

75% of the electric railways use

B-V Punches



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BONNEY-VEHSLAGE TOOL CO., Newark, N. J.

Direct Automatic Registration
By the
Passengers

Rooke Automatic Register Co.
Providence, R. I.

You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
345 Madison Avenue, New York
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Chicago Office: 1657 Monadnock Block
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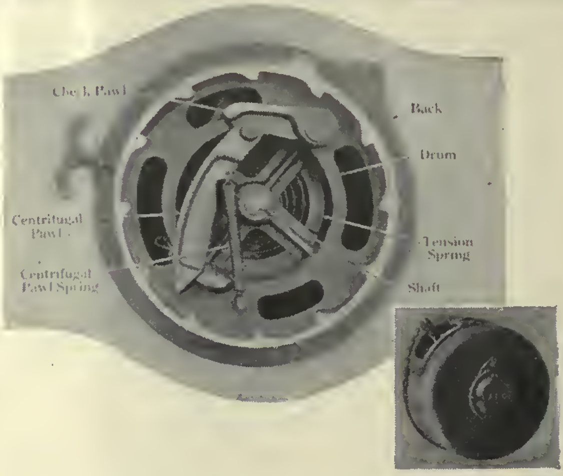

Ever stop your watch by winding it?

Overwinding will put the average retriever or catcher out of action. Added maintenance expense.

EARLL
Catchers and Retrievers

cannot be overwound. The one-piece tension spring maintains steady even tension throughout long years of service. It requires a minimum of winding effort, saving time, avoiding delays.

This and four other exclusive Earll Catcher and Retriever Features are vitally important. Get the whole story.

C. J. Earll, York, Pa.

TULC
A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio

ACKLEY BRAKES
Found The World Over

The No-Staff Brake
for any size and type of car

Apply the advantages of the staffless brake with its space-saving features, to all your cars. Ackley No-Staff Brakes are adaptable to any kind of service. The eccentric chain-winding drum insures quickest applications and maximum power.

Price only $32.00

NO-STAFF BRAKE
ACKLEY BRAKE & SUPPLY CORPORATION
G S ACKLEY & COMPANY REPRESENTATIVES
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WHY NOT TRY
A. GILBERT & SONS B. F. CO.
ST. LOUIS, MO.
U.S.A.
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National Railway Appliance Co.
Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., N. Y.

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Pittsburgh Forge & Iron Co.'s Products
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National Hand Holds
Drew Line Material & Railway Specialties
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Economy Electric Devices Co.
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C-H Electric Heaters
Garland Ventilators
E-Z Car Control Corp. Safety Devices
Lind Aluminum Field Coils
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Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

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Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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1 to 3 inches	$4.50 an inch
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An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E. R. J.

POSITIONS VACANT

A TECHNICAL man with some railway experience wanted by a small electric railway property in New England. Splendid opportunity for right man. P-600, Elec. Railway Journal, 10th Ave. at 36th St., New York.

STOCK clerk wanted familiar with storekeeping methods for a street railway company operating small property in New York City. Make application in own hand writing to P-598, Elec. Railway Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

AN executive of broad experience in dealing with the public and city officials, and who has successfully managed a good sized city property for a number of years, will be open for engagement after September 1st and would like to communicate with owners of property that requires building up, with a view of taking charge of same. If interested address Care A. N. J. Smith, Box 202, Newmarket, New Hampshire.

CLAIM agent, 15 years' experience with big street railway company, desires to change position. Can take full charge of claim department PW-599, Elec. Railway Journal, 10th Ave. at 36th St., New York.

ENGINEER has mechanical and electrical design experience, thorough grounding in fundamentals. Personal characteristics, high degree of analytical power, proven inventive ability, initiative, command of spoken and written language; believe that I have good judgment. I want a position, preferably in a factory engineering organization, where the solution of design and manufacturing problems means direct returns to employers, wider experience and commensurate remuneration for myself. Available on reasonable notice. PW-597, Elec. Railway Journal, Real Estate Trust Bldg., Phila., Pa.

MR. MANAGER, are you in the field for a superintendent of transportation? If so, you should realize that practical experience is an important factor in the successful handling of this department. The writer of this ad has a proven successful record of nineteen years on city, suburban and interurban properties and can furnish high grade references as to character and ability to get results on any property regardless of size or condition of same; at present with large property; personal reasons for making a change. PW-595, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITIONS WANTED

SHOP superintendent, 14 years' experience in all branches on city and interurban equipment. Good record and best of references. PW-581, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MANAGER or superintendent of railway, light and power properties, technical education, successful organizer tactful in public relations and very resourceful in rehabilitating properties, excellent references. PW-596, Elec. Railway Journal, 10th Ave. at 36th St., New York.

SUPERINTENDENT of equipment or master mechanic; twenty-three years' experience on city and interurban properties; have handled construction on transmission lines, substations, power plants, track and trolley work; available any time. PW-594, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MASTER mechanic wants position, 18 years' experience rebuilding and maintenance cars, armature winding. Best reference. PW-593, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MASTER mechanic, city or interurban railways, experienced on all branches. Good record. Good references. Available after Aug. 1. PW-582, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

FOR SALE

50-Ton Electric LOCOMOTIVE

600 Volt—D. C.

Locomotives are complete in every respect and are in excellent condition.

Full Specifications Upon Request

Hydro Salvage Syndicate

Niagara Falls—Ontario

STREET CARS FOR SALE

The Commission offers for sale by tender complete street cars and trailers as listed below. Sealed tenders addressed to the Chairman, endorsed "Tender for Street Cars," will be received until noon of

September 21st, 1923

at the offices of the Commission, 35 Yonge St., Toronto, Ontario. A cheque for 5% of the amount of the offer, payable to "The Toronto Transportation Commission," drawn on and accepted by a Canadian chartered bank, must accompany each Tender. Tenders for the whole or a part of the lot offered will be received. The cars offered are now on the Commission's property in Toronto, and Tenders must be based on acceptance of the cars as and where they are at present located.

Rental of flat cars for the removal of the cars offered, from the Commission's property to steam railroad siding, may be arranged with the Commission by successful tenderers.

Payment shall be at par in Toronto, and full payment for cars bought shall be made to the Commission before the removal of any cars from the Commission's property.

Cars For Sale

53	Single-truck cars complete with G.E.-67 motors;
8	Single-truck cars complete with G.E.-1000 motors;
9	Single-truck, double-end operation cars complete with G.E.-67 motors;
12	Double-truck (Brill Max.) cars complete with G.E.-67 motors;
47	Single-truck trailer cars complete.

A condition of the acceptance of any Tender is that the cars must be removed by the Tenderer from the property of the Commission within one calendar month from date of notification of acceptance by the Commission to the Tenderer by registered mail.

Copies of a detailed Inventory may be secured and appointments to inspect may be arranged through the Executive Department, Public Utilities Building, 35 Yonge St., or the Rolling Stock Department, 4 Sherbourne St.

The highest or any tender not necessarily accepted.

H. H. COUZENS, General Manager,
Toronto Transportation Commission.

FOR SALE

26 K-34 Controllers

TRANSIT EQUIPMENT COMPANY
Cars—Motors
501 Fifth Avenue, New York

FOR SALE

20—Peter Witt Cars

Weight Complete, 33,000 lbs.

Seat 53. 4—G. E. No. 258-C Motors. K-12-H Control. West. Air Taylor Trucks. R.H. Type. Complete.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

"Opportunity" Advertising:

Think *"SEARCHLIGHT"* First!

Motors
Engines
Trucks
Wagons
Carts
Wheel barrows
Tents
Canvas
Rehber 23 G

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"Red Tape!" "Surplus Property Sales conducted by government!" "Surplus Property Sales full of Red Tape!"—are conclusions drawn by some business man.

The facts are War Department Sales are so simply operated that any business man who does not at least investigate may overlook many worthwhile opportunities.

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Your Government is doing a good job for you as a man in business and as a tax payer. Don't be deterred by imaginary red tape. Surplus Property Sales are conducted on a business basis.

Investigate, and through investigation participate in a gigantic enterprise out of which you can profit directly, just as you profit as a taxpayer indirectly.

The Way to Investigate

Watch your Commercial Business Publication and the Metropolitan Dailies for announcements of specific auction or sealed bid sales.

Send for the Catalog mentioned in the announcement.

Check off the items that interest you.

Send a representative to the sale to inspect the materials—in advance, *if possible.*

To ensure you more leeway, send your name and address at once to Major J. L. Frink, Chief, Sales Promotion Section, Room 2515, Munitions Building, Washington, D. C. Advise him the character of materials you are interested in, and catalogs containing such materials will be forwarded you as rapidly as sales are scheduled.

Final commodity sales will begin in September and continue until liquidation of stocks is completed at the Quartermaster Depots in Brooklyn, Chicago, San Antonio and San Francisco. Offerings include a wide range of Quartermaster Supplies, Ordnance Property and smaller quantities of Engineer Property, Chemical Warfare and Medical and Hospital Supplies.

Important sales of Real Estate, Buildings, Plants and Warehouses will be held at Camp Devens, Ayer, Mass.; Ordnance Reserve Depot, Amatol, N. J.; Ordnance Reserve Depot, Toledo, O.; Camp Knox, Louisville, Ky., and Camp Lewis, American Lake, Wash. Definite dates will be announced later.

Look for the Eagle before you shop.

WAR DEPARTMENT

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers, Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stand
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
Ajax Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
A. Gilbert & Sons, B. F. Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Baldwin Locomotive Works
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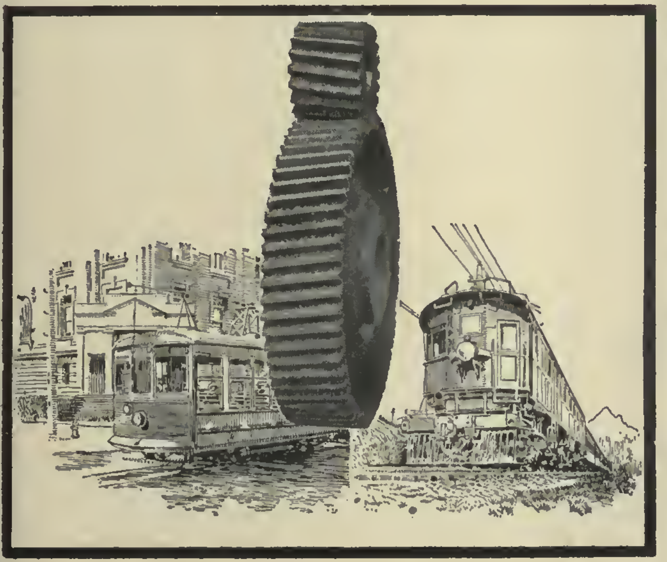

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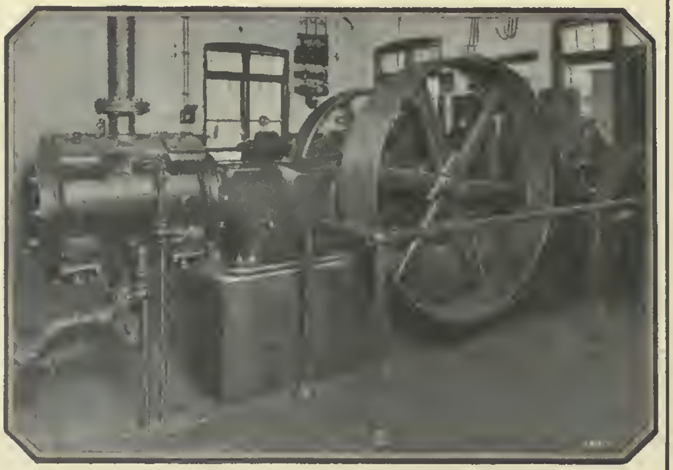

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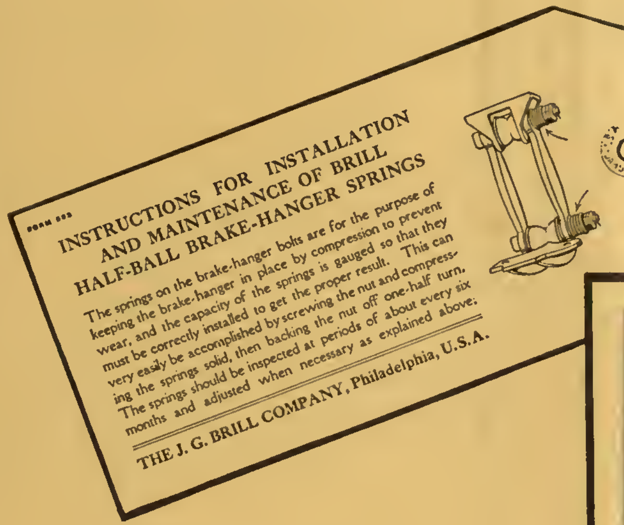

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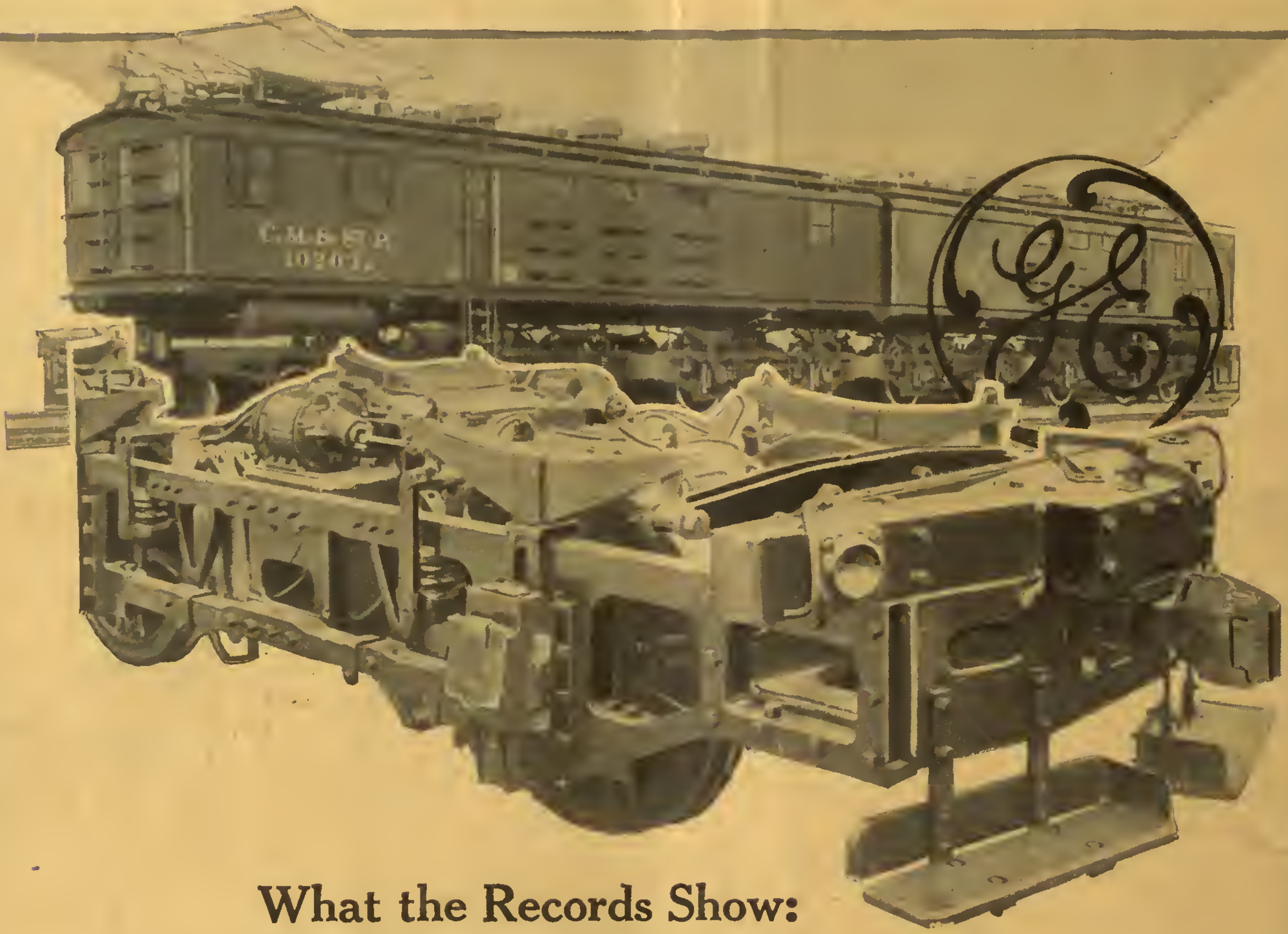

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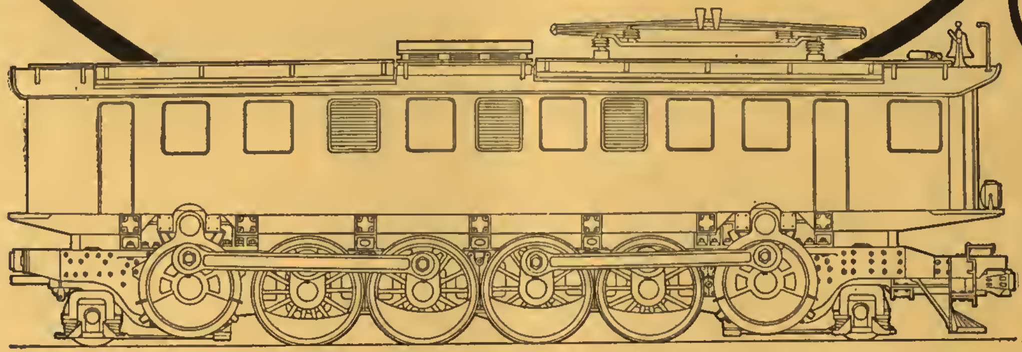

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Number of copies printed 5,875

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

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Published weekly
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
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Wabco Packing Cups have practically banished brake cylinder leakage, resulting in better air brake performance with reduced labor, and less wear, on the part of the compressor.

Wabco is so constructed as to be virtually indestructible and lasts for years under average conditions.

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Views in the Laboratory of the O-B Technical Department. Here, samples from the O-B foundry are continually checked or new formulas for new applications developed.

Putting Long Life into O-B Bronze

O-B Bronze is not just any bronze. The term is used in distinction as representing a bronze under constant technical control in the O-B foundry.

Long and intimate contact with the circumstances under which O-B products are used reveals what qualities are most desirable in the metal. So there is one formula and one metallurgical operation for cast ears, another for splicers, a different one for extruded ears and so on.

An unusually well equipped laboratory originates the formulas and regulates the foundry. Metallurgical control is thorough and complete. It includes chemical analysis of content, photomicrographic examinations of structure and physical tests to determine the ultimate tensile strength, elastic limit, elongation, reduction of area, resiliency and hardness.

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The Pyrometer test on each crucible of O-B Bronze assures best casting and uniform metal.

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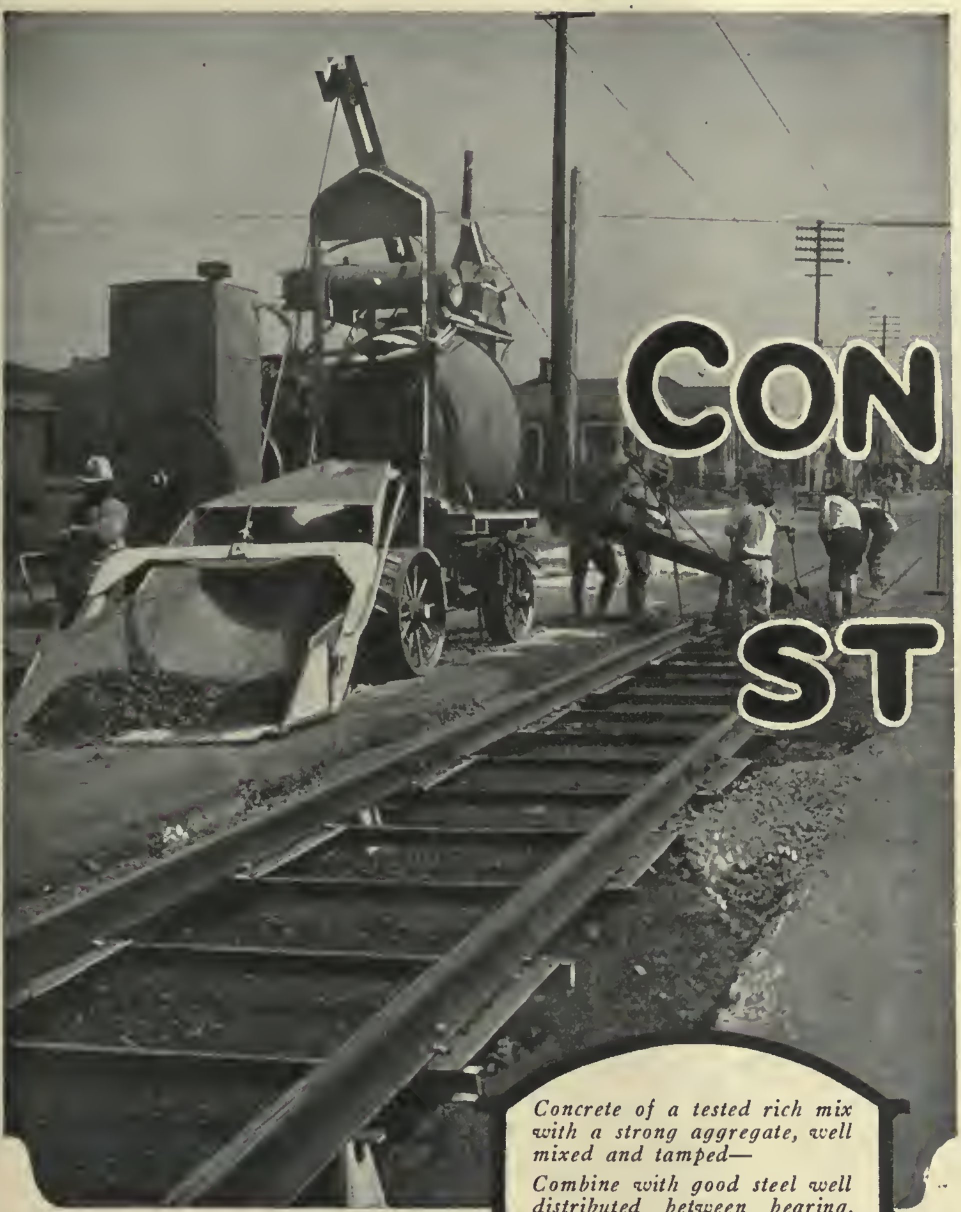

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Concrete of a tested rich mix with a strong aggregate, well mixed and tamped—

Combine with good steel well distributed between bearing, reinforcement and tie members. These are the logical permanent materials for the foundation of the best paved track.

There is nothing in such construction to absorb water; to start cracks nor to rot and undermine the rail and joints.

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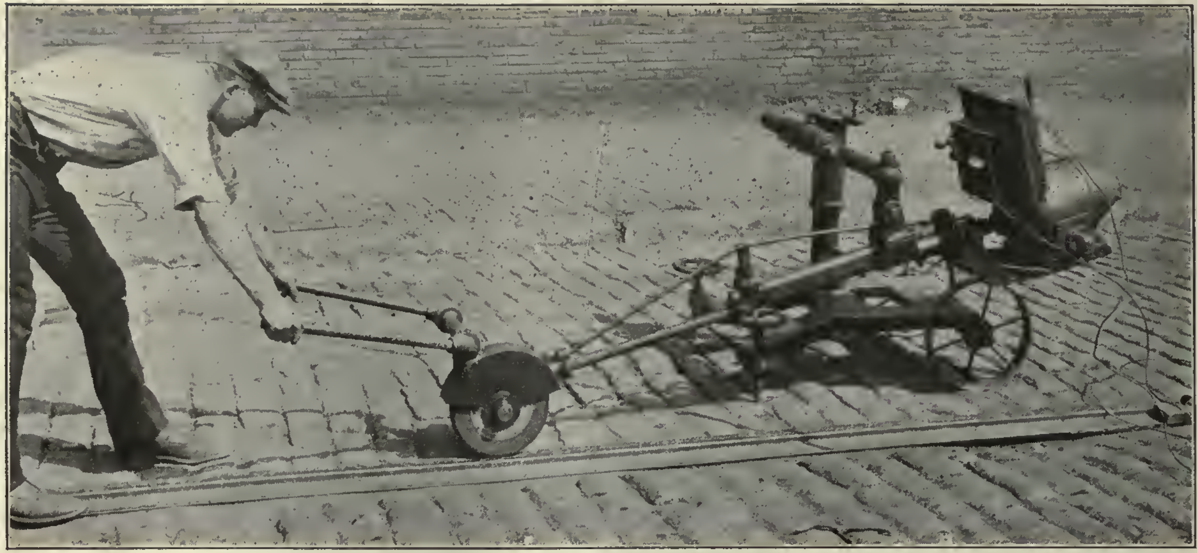

"Hercules" at work

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Ideal for removing surplus metal after building up low joints or special work. A simple pin permits adjustment for grinding in the groove or on back of rail at any angle.

Mighty handy also for snagging castings in shop or foundry.

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The whole machine weighs only 500 pounds, sells at a reasonable price, is strong, easily moved about and built to stand plenty of service.

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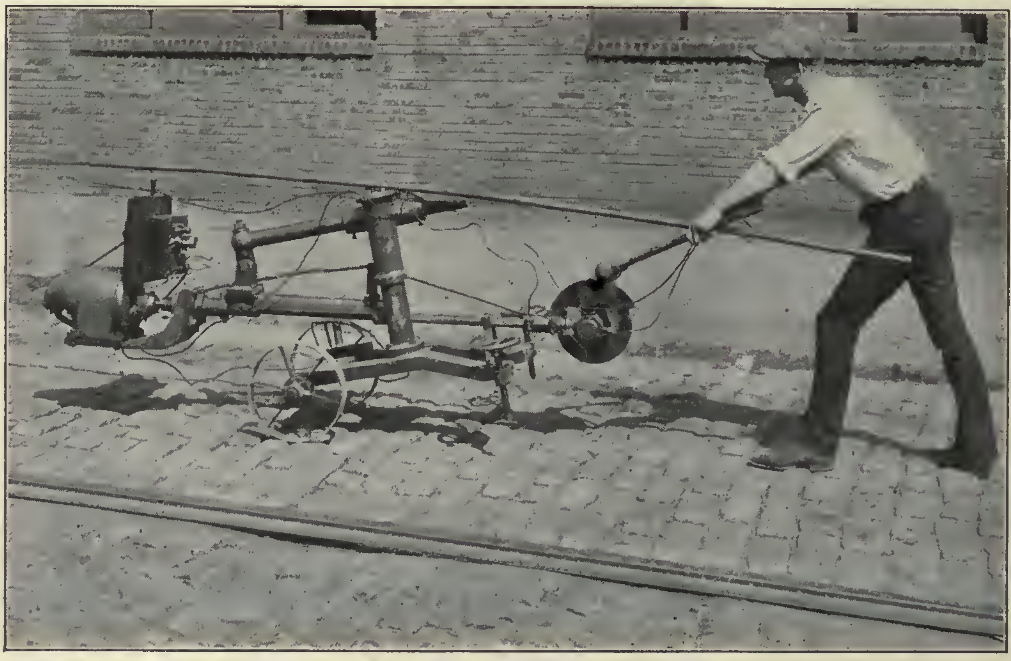

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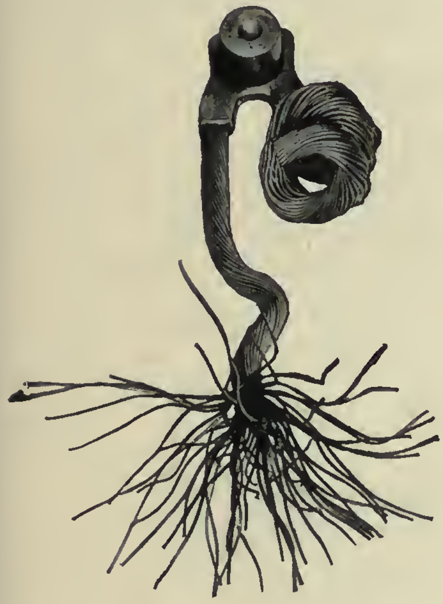

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Not a weak link in them! Terminals of dense, pure soft copper; "shot-over" sleeves which protect the strands where they join the terminals, and wire strands which will not crystallize under vibration. Every inch, from terminal to terminal is flexible, durable and of equal conductivity.

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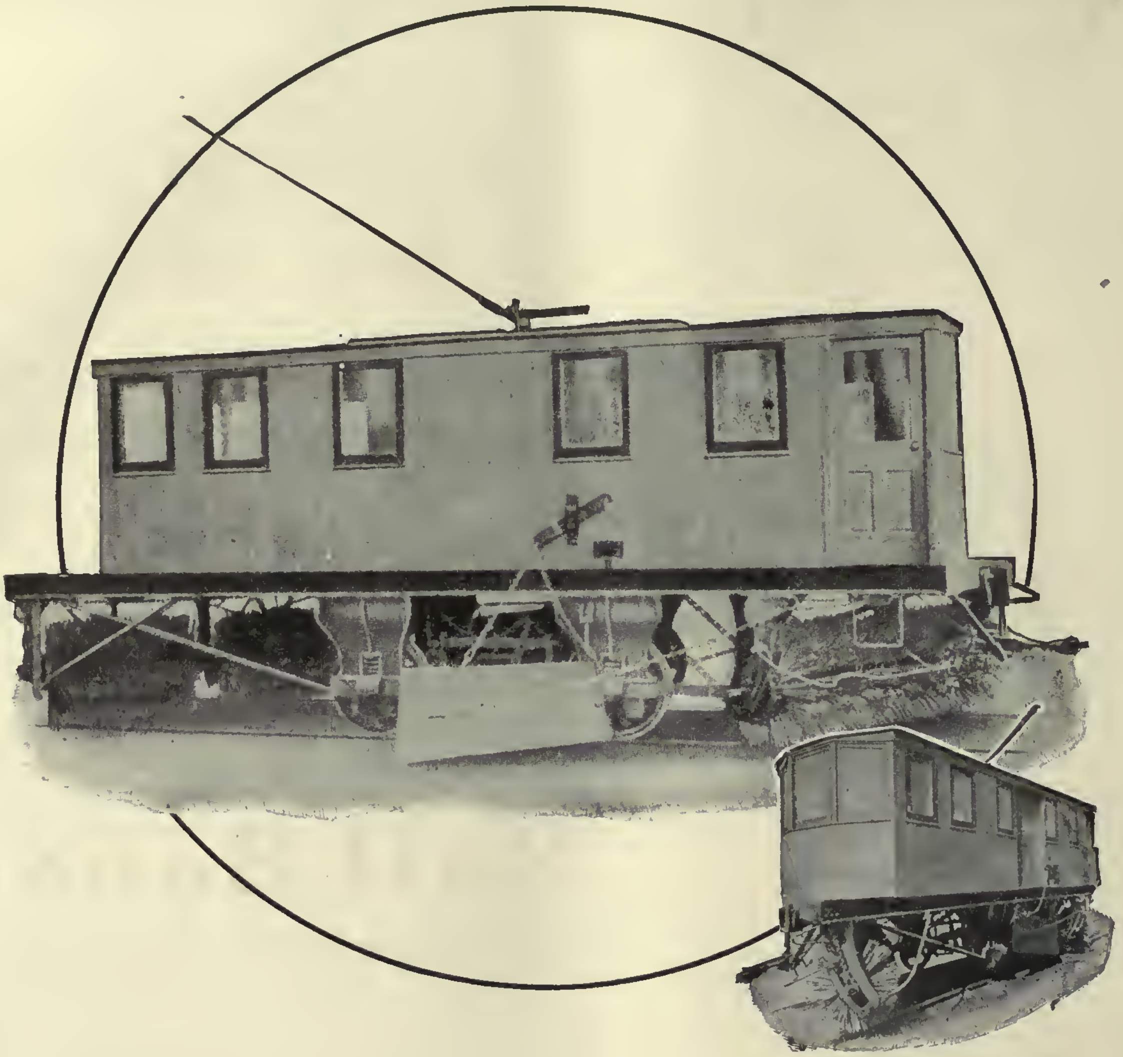

Efficient Snow-sweepers and McGuire-Cummings Mfg. Co. are names linked together in the mind of a majority of America's electric railway men. Fully 95% of all electric snow-sweeping equipment used in the United States and Canada is of McGuire-Cummings make.

The Standard single truck, steel underframe, long broom sweeper shown above is exceptionally strong and rigidly built, handling deep snow rapidly without stalling. The long broom clears both rails and fifteen inches additional on the outside of each track. Each broom is equipped with case-hardened roller bar steel belt chain, with detachable links.

Over 1,400 of these long-broom sweepers are in use in all parts of the world where they have snow to contend with. Sweepers are also built in other types to cover every snow-fighting problem.

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Equally applicable to automotive transportation units as well as railway cars. Pneumatic operation of doors and steps saves seconds at every stop, relieves the operator of the extreme muscular fatigue, resulting from hand-operated doors, and practically eliminates the risk of boarding and lighting accidents.

National Pneumatic Door Engines are simple, rugged and easy to install. They are actually in service on over 65,000 electric railway cars today.

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With Galena Oils and Service in the Field

Galena lubrication practices are founded on experience—they do not deal in theory or experiment. Galena service has the first hand knowledge acquired in forty years of constant contact with every kind of equipment and operating conditions.

Galena lubrication works for efficiency and the elimination of waste—in oil, time, labor and equipment. Right oils and correct methods of use invariably produce economical as well as satisfactory results. Galena service has yet to record the first failure of its recommendations to provide improved operation and lower cost.

The advantages of such competent authority must be apparent to the operating, as well as the mechanical officers. The savings accomplished through better service and lower cost of upkeep should be of vital interest to the Purchasing Department. A tabulation of lubrication performance makes the only reliable record of these features for true comparisons.

From our Service Engineer's Reports*

"The amount of valve oil fed to all the engines is still quite liberal, but the Chief Engineer says that the engines are working much better since using our products, and as soon as the bad effects from the use of the other oils are removed and a good surface on the cylinder walls is obtained, the amount will be considerably reduced."

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"In a recent demonstration for a new device for oiling motors it was determined that the consumption was three gallons per car each month as compared with one gallon under our methods. At a conservative estimate the consumption of oil would be twice that necessary with Galena methods. With these oilers installed on the motors it is conceded that a seven to ten-day inspection is necessary, with the entailment of extra labor, and a renewal of wick every sixty days."

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"The Engineer informed me that he was getting excellent results from the use of our Galsig Engine Oil. On a 200-kw. machine driven by a turbine making 3,600 r.p.m. the practice is to change the oil used on the bearings every four weeks, filter it and use on outside machinery instead of new oil. This seems an ideal arrangement for this plant."

**These excerpts are taken from the weekly reports of our Service Engineers. We vouch for their reliability and accuracy in every detail.*

Galena-Signal Oil Company

New York Franklin, Pa. Chicago

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C-129 Master Controller Light in Weight and Requiring Minimum Platform Space

PC Control–

365 Equipments Now on Order

The continued popularity of PC Multiple-Unit Control for train operation is manifested by this large number of orders:

	PC Equipments
Boston Elevated Railroad	40*
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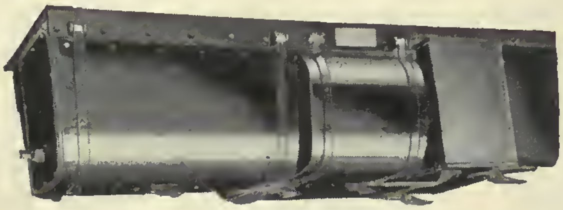
Barcelona Underground Railway, Spain	10
Chicago & West Towns Railway	8
Interstate Public Service Co., Indiana	3*
Mexico Tramways	6
New York Central Railroad	30*
Hudson & Manhattan Railroad	25*
Java State Railways	25
Georgia Railway & Power Company	20
*Repeat Order	365

PC5-Motor Controller with Cover Off—Arc Chute Swung Down—Showing Accessibility for Repairs and Inspection

Heavy and congested service requires train operation. The adoption of PC Control is insurance of reliability in this class of service. More than 65% of the equipment listed above are repeat orders—the best recommendation for any equipment.


PC5-Motor Controller Complete

General Electric Company
Schenectady, N. Y.

GENERAL ELECTRIC

23-283

New York, Saturday, September 8, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 10

Japan Can Be Assisted Through Red Cross Contributions

ELECTRIC railway men the world over will feel a special sympathy for Japan in its disaster. Tokyo is a city of many small homes and consequently of magnificent distances. This has necessitated an extensive transit system in the city, in addition to the electric interurban railway between Tokyo and the port of Yokohama, 17 miles away. The existence of extensive water powers in Japan has encouraged electrical development also throughout the empire. In consequence, Japanese railway engineers and transportation officials have become close students of what is the best practice in other countries, and many of them have gained many friends in Europe and America during visits to these continents.

Details are not available yet of the effect of the earthquake and fire on the transportation systems of Yokohama and Tokyo, but in such a widespread catastrophe they could not have escaped serious damage. The Red Cross has already set in motion relief measures, and readers of this paper cannot show their sympathy with Japan in a more practical way than by contributing to that fund.

Designing the Car to Speed Up Schedules

THAT increasing attention is being shown by operators to means for facilitating speedier operation of trolley cars is evidenced by the studies made in Chicago to analyze passenger movements in boarding and alighting from cars, as described in the issue of ELECTRIC RAILWAY JOURNAL for Aug. 25. These studies, involving an elaborate series of tests, were made in order to determine the relative advantages of the single-door versus the double-door safety car in facilitating the interchange movement of passengers. Out of this test also came a method for quickly determining the fitness of any type of car for the particular traffic on a given line.

With the increase of traffic of all kinds on busy city streets while street car business is simultaneously growing, studies of this character help in a constructive way to bring about the use of such cars as can handle the traffic presented, not only at the same speeds as heretofore in spite of increasing congestion, but at higher schedule speeds. It is significant that the schedules can be increased in ways such as this without any higher speed while in motion, and with the same motor capacity. The gain is entirely in eliminating time wasted in stops.

Although the time saving at each individual stop is small it is a great amount in the aggregate. If a car is making a schedule of 10 m.p.h. with ten stops per mile, the saving of but one second at each stop will give an increase of about 3 per cent in the schedule speed. In a railway system of considerable size it will be possible to utilize most of this gain, so that operating expenses can be reduced or service can be increased almost in proportion. And if the cars are designed right in the first place it can all be accomplished at no cost whatever.

Today, with the small margin that exists between income and outgo, careful attention to such factors as this is of vital importance, as the success of the industry depends on giving good and fast service at the lowest consistent cost. Other industries have been obliged to recognize changing conditions and have adapted themselves to keep in step. The street railway should in its function of a public utility continue to be a leader in this direction. In other words, the need to modernize was never so great as today.

Preparations to Combat Snow Are as Necessary as Ever

FEW people are aware of the frequency or real extent of the snowfall in their own locality. There is a widespread popular belief in many parts of the country that less snow falls now than was the case years ago. Some electric railway men even, who should have been disillusioned by bitter experience, share this belief. The prevalence of the idea that winters are less severe often tends to permit laxity here and there in taking adequate precautions to keep railway lines open. Here is a good place to practice thorough preparedness, and considerations of this matter are now in order, even though it may be 104 deg. in the shade on the day this issue of the JOURNAL reaches its readers.

Statements and figures of the United States Weather Bureau entirely contradict the theory of milder winters. Their records show that there is no outstanding trend either way. In fact, the seasonal snowfall is an extremely variable quantity. For example, the winter of 1918-1919 established a low record at New York. The very next winter, however, snowfall was far in excess of the average. At Philadelphia during the five-year period from the fall of 1913 to the spring of 1918 more snow fell than in any other similar period of which there is record.

The heaviest single winter known to the New York weather bureau was that of 1892-1893. On the other hand the ground was snow covered in 1919-1920 for a greater number of consecutive days than ever before. In New England the winter of 1915-1916 was the equal of many historic snowy ones. At Chicago 64 in. of snow fell in 1917-1918.

The lesson to be learned from these facts is that precautions to combat winter snow storms are as necessary as ever. Every railway needs an adequate equipment of plows and sweepers. Moreover, a comprehensive snow-fighting plan, such as is described elsewhere in this issue, is likely to prove of value. Auxiliary apparatus, ice cutters, track scrapers, snow loaders, etc., have their places, too. Money spent to provide proper snow-fighting equipment will usually be saved by subsequent freedom from tie-ups.

Helping to Develop Buses on a Sound and Legitimate Basis

ELECTRIC railway men will be interested to note the respective policies of the several bus papers regarding the relation of different types of transportation, as indicated in the following quotations from their editorial pages.

Bus Transportation, discussing the New Jersey situation and the plan of settlement proposed by the railway, has this to say:

> Considering only the bus aspects of the plan, at its foundation is the recognition that transportation, like electricity and gas, to be sold most economically and with the greatest satisfaction to the user, must not be supplied by separate organizations under competitive conditions. *Bus Transportation* believes that only through proper co-ordination of bus and rail can the best interests of the public and of the two types of transportation be met.

Better Buses, the first issue of which has just recently appeared, states its policy in the first editorial as follows:

> We believe that the motor bus should be regarded as a major transit facility, rather than merely as a feeder to other modes of transportation, even though these have long served a useful purpose and are continuing thus to serve. . . . Highways are built for the public and should be open to every useful business undertaking. We join with those who see injustice in singling out motor bus lines for taxation, from which other commercial users of the public highways are exempt. . . .
>
> We do not expect that all will agree with this outline of policy. It must be admitted, however, that the views herein expressed reflect the opinion of the large majority of motor bus owners. Moreover, our attitude is such as will appeal to the spirit of fairness. This being so, those who now dissent from it must eventually yield.

National Taxicab and Motorbus Journal shows its knowledge of the past history and fundamentals of transportation this way:

> Where a responsible operator of a motorbus or motor freight line, or both, stands ready to render service between points now inadequately served by rail, or on the other hand, adequately served at a loss to the operating rail line, it is a fallacy absurd and uneconomic to refrain from granting the newer and cheaper form of transportation service permission to function.
>
> A few of the narrow-minded rails are constantly beclouding the issue with specious arguments of various kinds. By so doing they show themselves unable to rise to the occasion.
>
> Motor transportation has a long way to go before it will entirely supplant the rails, if ever it will. The narrow-minded element of the rail camp might well bear in mind that the rail and the motor vehicle are not attempting to crowd each other from the field of public patronage, but are agencies capable of developing side by side and of finding their own broadest field in joining resources for the perfecting of the public service of transportation. And this can be done as competitors—there is no need whatsoever of listening to the fallacy that transportation is a natural monopoly.

Bus Transportation has based its program on long experience and knowledge in the passenger transportation business, with full appreciation of the desirability and the necessity of encouraging new development to the fullest extent. During its almost two years of existence, it has made a consistent effort to spread the philosophy of co-ordinated rather than competitive services, and railway men should thus be able to appreciate the value of this paper to them, not only as a service to help them in their own bus enterprises but also as an exponent of sound bus development. And the paper is, for the same reason, of just as great service to the independent bus men, for the philosophy of co-ordination of buses with other transportation lines is best for bus as well as railway and is in fact the only sound basis on which bus men can develop their service if they hope to create a substantial business. It is just a matter of plain economics, provided a community does not choose to subsidize one form of transportation while penalizing the other.

It is increasingly evident, after all, that it is a good thing it was the McGraw-Hill Company that started *Bus Transportation,* and started it early, and made it easily the leading paper in its field.

Proper Assignment of Cars May Result in Large Economy

FOR best results the equipment on each street car route, or sometimes on a group of routes, should be uniform, for the speed of an entire line is determined by the slowest cars assigned to it. This speed may be determined by the characteristics of the motor equipment, or it may be fixed by the time taken at stops. Little argument is needed to show that cars capable of making a fast schedule should not be held down by those of slower types. Sometimes a line can be speeded up as much as 10 per cent in this way.

Car capacity is a second factor that merits consideration. The change from a car with a seating capacity of, say, thirty-nine to one with forty-four seats may make possible a lengthening of rush-hour headway from one and one-half to two minutes. Not only is a reduction in street congestion effected thereby, but the use of fewer cars in the rush hour makes the question of tripper runs less serious.

Another important feature of the car assignment problem is its reaction upon the public. Car riders notice the appearance, both interior and exterior, of the vehicles in which they ride every day. If the cars are all alike and the type is a reasonably satisfactory one, the regular patrons are likely to be satisfied. On the other hand, if four or five different types of cars are operated on a single line, this fact is noticed at once. Patrons are likely to think that the railway is operating "a lot of old junk" on their line. The presence of even a single car of unusual type, such as a car with longitudinal seats where cross-seats are customary, may seriously disturb the complacency of the regular riders.

Traffic conditions on different car lines seldom are exactly alike. The work of the traffic engineer should determine the characteristics of each route and obtain as much information as possible regarding its needs in the way of equipment. He will have to work in co-operation with the transportation and mechanical departments, of course, since many questions arise that must be settled by them. It is plain that there will be need for compromises, particularly when there are several types of cars to be used that have widely different characteristics.

While the traffic engineer usually can determine the type of car best suited to the service on any particular line, few railways having cars of differing ages and various designs will have a sufficient number of each available to equip each line with cars of the desired type. The fact that the ideal is impossible of attainment should not, however, deter the management from going as far as it can in that direction.

While the Storm Lasts Plows Are Used on the Suburban Lines

Sweeper Routes Are Shorter in This Kind of Territory

Fixed Snow Sweeper Routes Are Desirable

A Carefully Prearranged Plan to Combat Winter Storms Has Proved Its Worth on Many Occasions—Plows Are Used Also as Levelers—Scrapers on Cars Are a Help

SEVERAL years of experience with a comprehensive set of eighty-nine sweeper and twenty-six plow routes, covering the entire Public Service Railway system in New Jersey, has demonstrated the value of this method of handling the snow-fighting problem. The work of snow removal has been more efficiently performed, and delays and interruptions to service have been reduced in number because of the more frequent and more thorough clearing of snow from the tracks.

A set of snow-sweeper routes is made for each operating division, the number of routes depending upon the number of sweepers available, and the trackage of the division being divided into as many parts as there are routes. The mileages of the several routes are made approximately the same, but inequalities of length sometimes occur due to the character of the territory. Track in the open country where snow drifts deeply is likely to be more difficult to keep clear than is city track, and the sweeper routes should in such cases be made shorter. Less mileage may be assigned to an older and weaker machine, if that course appears to be desirable. No attempt is made to have the snow-sweeper routes coincide with routes used in actual passenger operation.

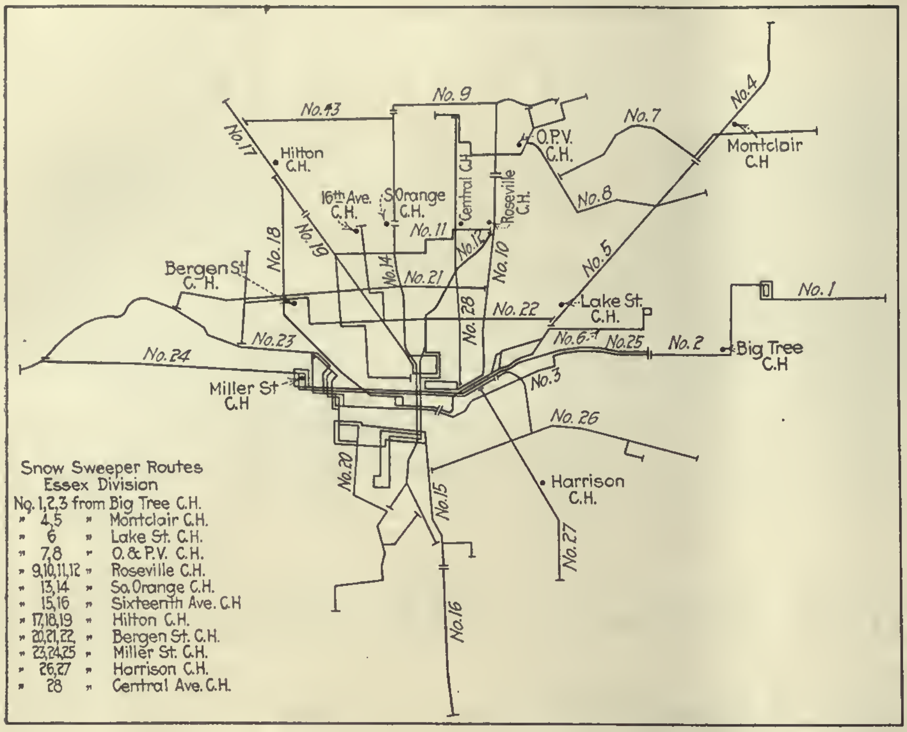
After all the trackage of the division has been assigned to the various sweepers, the routes are grouped together, each carhouse being made responsible for those in its particular vicinity. A table is then prepared showing the numbers of the routes, the names of the carhouses from which they operate, and an exact description of the track covered by each. The larger carhouses operate three or four sweeper routes, while the smaller carhouses operate only one or two.

Each sweeper has a definite section of line to keep clear. Routes overlap only in a few cases where that is necessary in order to reach a cross-over, loop or wye. When the sweepers first pull out of the carhouses a certain amount of duplication occurs when it is necessary for one machine to traverse the route of another in order to reach its own territory. This is reduced to a minimum, however, by having sweepers start out in opposite directions wherever the carhouse is located in the middle of a route. After a sweeper has reached its own route it remains on that and does not encroach upon the route of another sweeper except in case of emergency.

Several advantages have resulted from the adoption of this scheme. In the first place, all of the track is swept at regular intervals. In the center of the city, where several lines use the same street, there would be much unnecessary duplication of effort if a sweeper for each line covered the whole of that line including the portion in the city center. Moreover, there would be no way to control the time interval between sweepers on different routes, and the probability is that several sweepers would pass through the center of the city in rapid succession, after which a long time would elapse during which there would be no sweeping at all. But, by assigning the track in the center of the city to a single sweeper which does nothing but pass back and forth in that area, it is assured that this important part of the system will be swept at regular intervals and no undue accumulation of snow will occur to block the cars.

The elimination of duplication in the heart of the city makes it possible to give the suburbs more frequent sweeper service, because no time is wasted going over track that is already clear. The length of the average sweeper route is less than that of the ordinary operating line, and on this account it is easy for the division superintendent to keep track of his various units.

It is easy also to transfer a sweeper from one route to another. Blueprints of the table of snow-sweeper



Twenty-eight Sweeper Routes Are Laid Out According to This Plan with Little Duplication

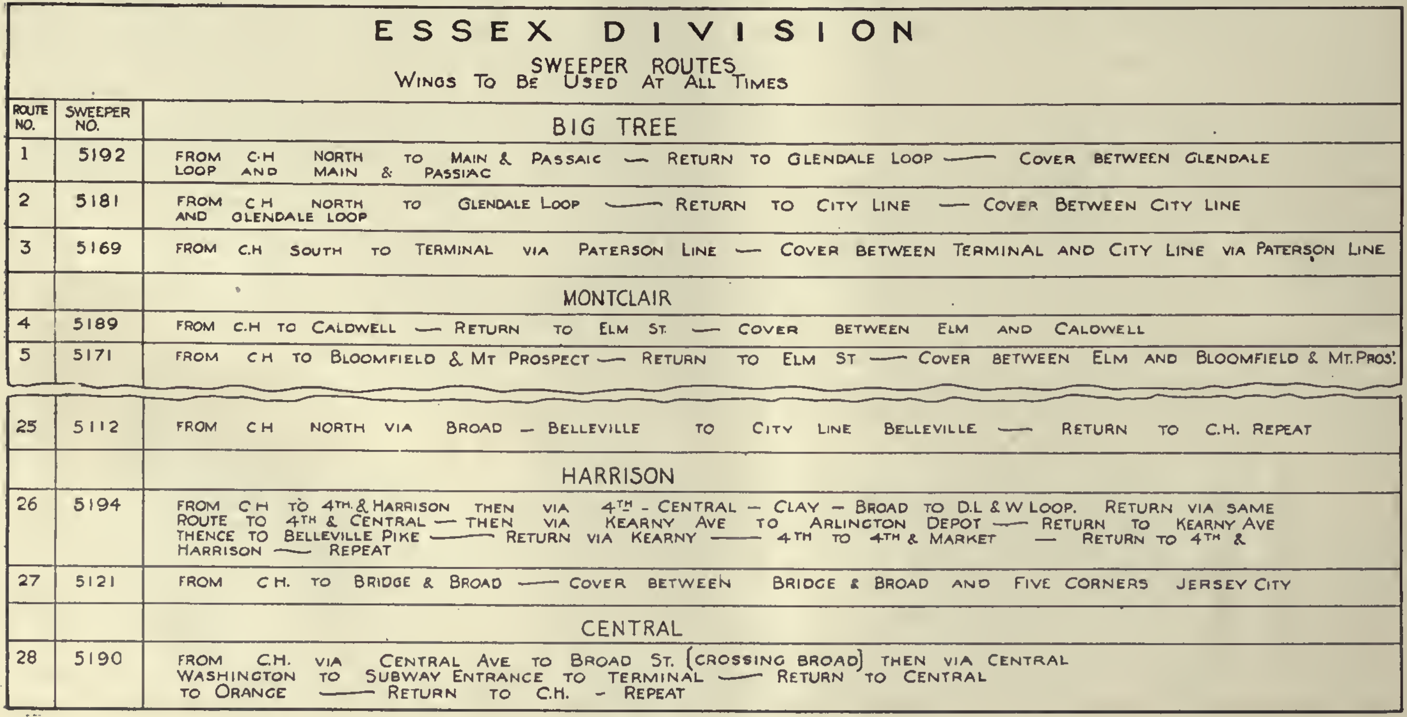
routes are made up by the traffic department and posted in the cabs of all sweepers. Copies of this schedule are provided for the supervisor of each carhouse, the superintendent of the division, and the general superintendent. Instructions to the operators of snow sweepers provide that they shall telephone to their own carhouse immediately in case of breakdown, and always at the end of each half trip. The location of every sweeper at any given moment is therefore definitely known, and in case one machine becomes crippled it is necessary only to tell the crew of a machine on an adjacent route to cover also that of the crippled sweeper. They have in their own vehicle the same schedule of routes that the division superintendent has, and if they are told by number to cover a certain additional route, they need no further instructions, the details of the route being thoroughly explained on the blueprint. The control of the whole operation of snow fighting is therefore much more centralized than would be the case were each line operating its own sweeper independent of the others.

By assigning individual vehicles by number to certain fixed routes it becomes possible to regulate carefully the streets on which they are operated. In case of small clearance due to the presence of an overhead bridge or other obstruction, the danger of accidents resulting from too great sweeper roof height is eliminated by noting in a prominent position on the table that certain sweepers must not operate on certain routes.

To each sweeper is assigned a definite crew of trainmen. These same men operate the same vehicle over the same route in every storm. They therefore become thoroughly familiar with their sweeper and with the characteristics of the territory they cover.

The whole procedure of starting the fight against snow is almost automatic. It is necessary only for the general superintendent to give the word that the sweepers shall go out. When this word reaches the carhouses each supervisor knows exactly what men and what sweepers he has to send out, and where they are to go. The men know the same thing and are prepared to commence their work at a moment's notice. No prolonged explanations are necessary in order to be sure that the entire line will be properly covered; that has already been taken care of in the preparation of the table.

Snow plows are assigned to routes in much the same way as are the sweepers. The former, however, have a dual function to perform. While the storm lasts they are used to clear the tracks out in the open country where deep drifts occur, as shown in the accompanying



ESSEX DIVISION

SWEEPER ROUTES

WINGS TO BE USED AT ALL TIMES

ROUTE NO.	SWEEPER NO.	
		BIG TREE
1	5192	FROM C·H NORTH TO MAIN & PASSAIC — RETURN TO GLENDALE LOOP — COVER BETWEEN GLENDALE LOOP AND MAIN & PASSIAC
2	5181	FROM C H NORTH TO GLENDALE LOOP — RETURN TO CITY LINE — COVER BETWEEN CITY LINE AND GLENDALE LOOP
3	5169	FROM C.H SOUTH TO TERMINAL VIA PATERSON LINE — COVER BETWEEN TERMINAL AND CITY LINE VIA PATERSON LINE
		MONTCLAIR
4	5189	FROM C.H TO CALDWELL — RETURN TO ELM ST. — COVER BETWEEN ELM AND CALDWELL
5	5171	FROM C H TO BLOOMFIELD & MT PROSPECT — RETURN TO ELM ST — COVER BETWEEN ELM AND BLOOMFIELD & MT. PROS'.
25	5112	FROM C H NORTH VIA BROAD — BELLEVILLE TO CITY LINE BELLEVILLE — RETURN TO C.H. REPEAT
		HARRISON
26	5194	FROM C H TO 4TH & HARRISON THEN VIA 4TH - CENTRAL — CLAY — BROAD TO D.L & W LOOP. RETURN VIA SAME ROUTE TO 4TH & CENTRAL — THEN VIA KEARNY AVE TO ARLINGTON DEPOT — RETURN TO KEARNY AVE THENCE TO BELLEVILLE PIKE — RETURN VIA KEARNY — 4TH TO 4TH & MARKET — RETURN TO 4TH & HARRISON — REPEAT
27	5121	FROM C H. TO BRIDGE & BROAD — COVER BETWEEN BRIDGE & BROAD AND FIVE CORNERS JERSEY CITY
		CENTRAL
28	5190	FROM C.H. VIA CENTRAL AVE TO BROAD ST. (CROSSING BROAD) THEN VIA CENTRAL WASHINGTON TO SUBWAY ENTRANCE TO TERMINAL — RETURN TO CENTRAL TO ORANGE — RETURN TO C.H. - REPEAT

Typical Snow Sweeper Table

illustration. After the storm has ceased the snow plows are used as levelers to push back the snow from beside the track to a point near the gutter, thus making possible the passage of vehicles alongside the cars.

Accordingly there is made up a set of plow routes to cover the outlying districts, and also a set of leveler routes to cover all of the city lines. The number of plows in a division ordinarily is less than the number of sweepers, and each leveler must therefore cover more territory. To level the entire trackage of a division with four or five snow plows means that each one must follow a long and rather complicated route. These have been worked out to the best advantage in the preparation of the schedule, and are explained on the blueprint. There is no danger, therefore, that a plow will stray from its proper path, however long the route may be. All that is necessary is that the operator shall follow the route as described in the table.

As an auxiliary means of keeping the rails clear, the company has found that Root spring scrapers have been of particular value. Air-operated scrapers of this type have been installed on several hundred cars. Their use is usually optional with the individual motormen, although instructions may be given at the carhouse when it is specially desired to have the scrapers used.

Fighting 145 Inches of Snow

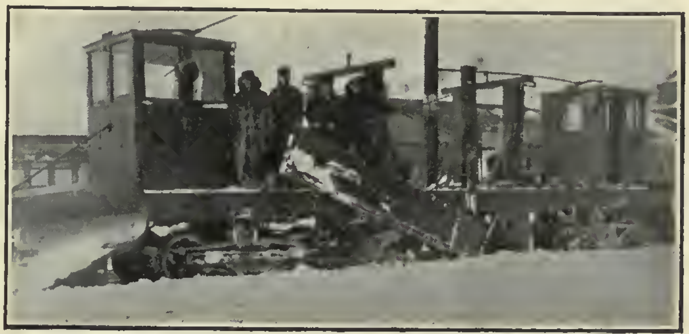
Levis, Que., Has a Combined Snow Plow and Ice Cutter that Assists Materially in Keeping the Track Open Despite Severe Weather Conditions

SNOW is always a problem in Levis, Que. While there is considerable snowfall every winter, last year the weather was especially severe, one storm succeeding another with just enough mild weather in between to compact the entire snowfall into a heavy mass hard to remove. During the winter season 145 in. of snow fell altogether, and the greater portion of it remained on the ground until spring.

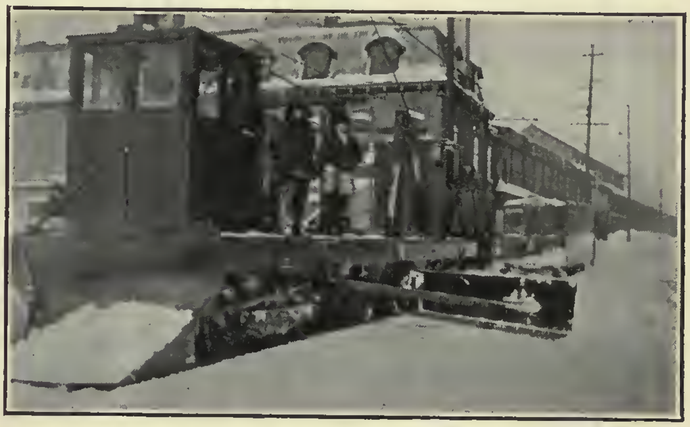
Much of the equipment used for snow fighting in Levis has been described in various issues of the ELECTRIC RAILWAY JOURNAL. Last year H. E. Weyman, general manager, added to his already complete equipment a new type of snow plow and ice cutter which proved particularly efficacious in dealing with the compacted snow and ice on the tracks. This plow, which is shown in the accompanying photographs, has a double mold board which throws the snow both ways—in Levis the lines are all single track—and in addition has an outboard plow which cleans a path about 10 ft. wide alongside the track.

The most novel feature of the outfit is the device for cutting ice. There are two cutters placed back to back for operation in either direction. Each unit consists of a V-shaped board under the center of the body and transverse to the direction of travel, on which is mounted a set of steel knives 6 in. wide. This cutter may be seen in the photograph of the plow with the outboard plow raised. This small size of knife was chosen to permit easy replacement in case of breakage, each one being a separate unit that can be removed independently.

The entire ice cutter may be raised or lowered by two air cylinders acting through the vertical pillars shown in the photographs. By this means the cutters can be placed in any position down to within approximately 1 in. above the level of the rail head. In order that there may be clearance outside of the track, and the paving will not be torn up, the cutters are raised slightly from the horizontal outside the rails.



The Outboard Plow Is Shown Raised. The Ice Cutter May Be Seen Beneath It



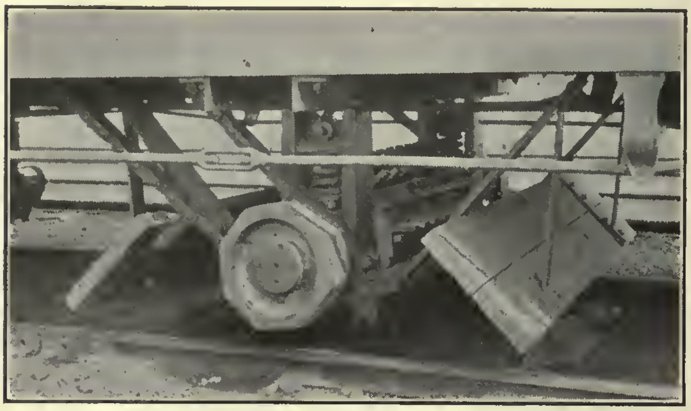
The Outboard Plow Is Here Shown in Position for Use

In action the plow can be driven by the motors at speeds up to approximately 15 m.p.h. The cutters are strong enough to clear away any thickness of ice that the machine can operate over. They are held in position by the air pressure, which gives a certain amount of flexibility, so that in the contingency that some extraordinary obstruction is encountered, the cutter will rise over it.

According to Mr. Weyman the plow has operated with great success, and it was found essential to keeping the line open under the abnormal conditions encountered. While the snowfall on the level was 145 in., the winds were severe a great deal of the time, so that the snow drifted in many places, reaching a depth of 15 to 20 ft. in the worst locations, which had to be cleared in order to open up a roadway for the cars.

The entire equipment was furnished by the Russell Car & Snow Plow Company, Ridgway, Pa.

The Main Street in Levis After It Had Been Cleared by the Plow and Ice Cutter



Only Interior Castings Have Teeth, as Rail Head Is Kept Clear by Plows and Sweepers

Revolving Teeth Cut Ice Between Rails

An Old Suburban Car Has Been Rebuilt at Erie—All Equipment Is Inside—Comfort of the Operator Is a Feature

THE damage to motor casings and other apparatus resulting from the presence of a hard ridge of ice between the rails is a familiar feature of winter operation. In the territory served by the Buffalo & Lake Erie Traction Company the danger of such an occurrence is especially prevalent because of the frequency and severity of the storms which sweep in from Lake Erie. For that reason the company has taken an old suburban car of obsolete type, completely dismantled the interior, and refitted it for winter service as an ice cutter.

Six hexagonal castings were pressed and keyed onto a shaft which is suspended under the center of the car. One casting is over each rail and four are between the rails. An angle iron with teeth cut in one flange is bolted parallel to the shaft on each face of the hexagonal castings. At present there are no teeth on the end castings because it has been found that the plows and sweepers keep the head of the rail itself free of ice.

The shaft is chain driven from a GE-87 motor inside the car body. A K-11 controller is used for this motor. The revolving shaft can be raised or lowered by a hand-operated worm gear, the lower limit bringing the teeth down to a level about 2 in. above the rail head. All equipment except the motors required to move the car, and the shaft itself, has been placed in the car interior. Air compressor, tanks, piping and wiring are inside, as shown in an accompanying illustration. The car is electrically heated and every effort has been made to have it comfortable for the men who must operate it, for it was felt that otherwise there would be a strong desire to pull the car into the carhouse before the work of ice cutting was thoroughly done.

Seasonal Snowfall Is Irregular

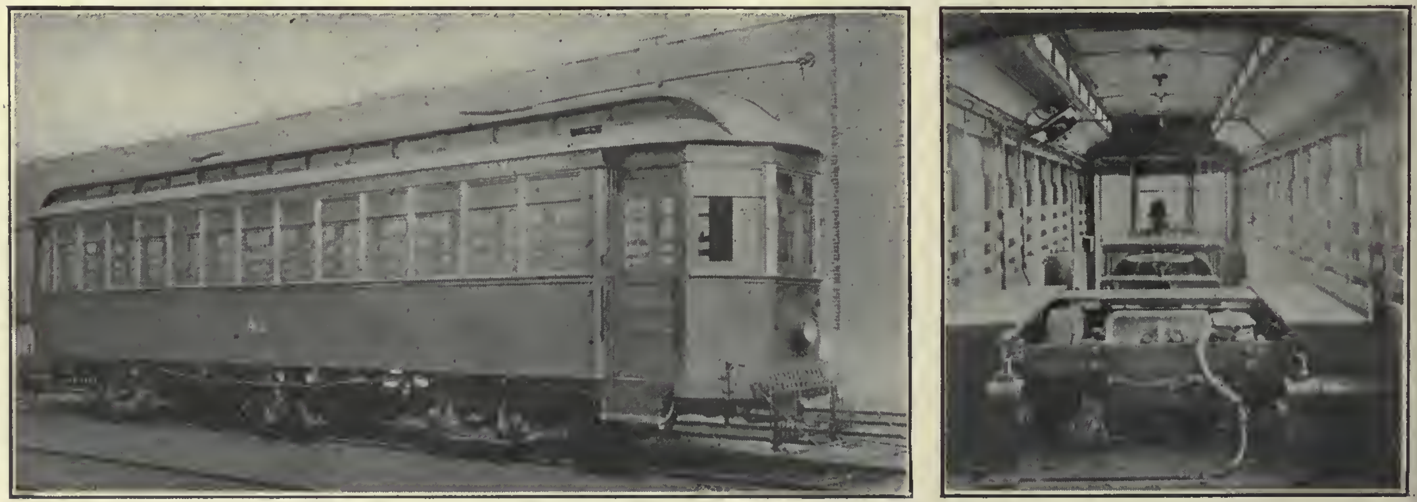
THE records of the U. S. Weather Bureau show that the annual snowfall varies in a most irregular manner. Sometimes there is an immediate reverse from a very light snowfall in one winter to a very heavy one the next. At other times there is a succession of winters with heavy snows or with light snows. The total snowfall by years for various localities is shown in the accompanying tables.

TABULATION OF SEASONAL SNOWFALL, IN INCHES

Winter	Philadelphia	New York
1885–86	20.2	23.9
1886–87	25.8	49.5
1887–88	30.0	46.6
1888–89	6.2	21.9
1889–90	7.4	34.1
1890–91	15.2	39.7
1891–92	19.9	36.5
1892–93	36.8	77.6
1893–94	20.3	56.1
1894–95	22.8	36.2
1895–96	17.8	42.0
1896–97	25.7	39.1
1897–98	19.4	20.1
1898–99	55.4	58.3
1899–1900	20.6	20.1
1900–01	10.6	9.2
1901–02	28.8	31.3
1902–03	16.8	26.0
1903–04	29.4	33.0
1904–05	43.8	57.8
1905–06	20.5	22.1
1906–07	38.6	52.4
1907–08	25.8	32.2
1908–09	20.2	20.7
1909–10	36.1	34.7
1910–11	28.5	26.0
1911–12	22.5	23.3
1912–13	9.5	15.4
1913–14	33.1	37.1
1914–15	32.5	26.8
1915–16	31.1	47.3
1916–17	39.6	49.7
1917–18	38.9	32.3
1918–19	4.5	3.3
1919–20	23.2	45.6
1920–21	11.7	17.7
1921–22	28.0	27.2

Winter	Chicago, Ill.	Minneapolis, Minn.	Cleveland, Ohio	Boston, Mass.	Denver, Colo.	Buffalo, N. Y.	Washington, D.C.	Seattle, Wash.	Omaha, Neb.
1912–13	20.7	47.4	33.7	19.4	66.1	62.9	8.8	16.2	20.2
1913–14	27.9	23.0	60.3	39.4	98.9	90.9	28.6	1.1	17.6
1914–15	19.0	50.2	32.8	42.2	44.0	76.2	14.5	T.	51.5
1915–16	26.1	50.7	42.4	79.2	44.1	104.5	17.4	60.9	19.8
1916–17	23.7	84.9	50.0	54.2	79.4	86.8	18.3	16.0	22.9
1917–18	64.1	30.8	51.2	45.7	64.1	110.5	36.4	6.0	26.3
1918–19	28.7	26.7	8.8	21.1	46.3	25.0	3.3	T.	20.6
1919–20	32.2	64.5	41.0	73.4	71.3	69.4	16.4	3.9	31.7
1920–21	9.8	20.6	25.9	34.1	56.7	53.5	6.8	9.0	20.9
1921–22	11.5	43.3	26.8	37.2	54.4	39.8	44.5	12.9	11.4

Official figures furnished by the U. S. Weather Bureau, Washington, D. C.



Left—Car Converted Into Ice Cutter with Cutter Mounted Under the Center of the Car. Right—All Equipment Is Inside Car, Including Compressor, Air Tanks, All Wiring and Controller and Motor for Driving the Cutter

Keeping Track of Snow-Removal Costs

Montreal Tramways Engineering Department Supervises Snow-Removal Work in Co-operation with the Several Communities in Which the Company Operates — Company Divides Cost with the Municipalities

By R. B. Genest

Chief Clerk Engineering Department, Montreal Tramways

SINCE December, 1918, the responsibility for supervising snow-removal work done by municipalities served by the Montreal Tramways has been carried by the engineering department of the company. According to the contract in effect between the city of Montreal and the railway company, the latter is liable for one-half the cost of snow removal. Article 66 of the contract reads as follows: "The company shall, under instructions from the city, keep its track free from ice and snow, and the city may, at its option, remove the whole of such part of the ice and snow from curb to curb as it may see fit from any street or part of street in which cars are running, including the snow from the roofs of houses, thrown or falling into the street and that removed from the sidewalks into the streets, with the consent of the city, and the company shall be held to pay one-half of the cost thereof."

Regulations of a similar nature cover also the surrounding municipalities and suburbs of Outremont, Westmount, Montreal East, Verdun and Point-aux-Trembles. The company pays only one-third of the cost of snow removal in the town of Montreal West, which is a small suburb located on the western outskirts of the city.

ACCOUNTING SYSTEM FOR CHECKING BILLS

When the engineering department took over this work, it was necessary to build up an organization to handle it both in the field and at headquarters. In preparation for this, the officials of all the municipalities concerned were interviewed and a number of accounting systems were investigated. The co-operation of the municipal officials was obtained, and arrangements were made to standardize the methods of compiling bills.

Arrangements were made so that detailed accounts in duplicate would be forwarded weekly by the city, enabling the company to make a weekly audit and eliminating congestion at the end of the month or on the completion of the winter season.

The forms reproduced herewith were designed to supply the necessary information for checking the bills. The term "snow special" is inscribed on these forms, so as to distinguish them from forms used on other snow-removal work, such as the removal of snow from the track space by the operating department sweepers, and snow and wing plows, and the work done by the engineering department section gangs on surburban lines, in yards, on sidings, etc. Some details of these forms are given below:

Timekeeper's Weekly Report of Working Time. Fig. 1.—This form is used by the city of Montreal and the Montreal Tramways timekeepers to check all classes of labor employed by the city of Montreal on snow-removal work. It is made out daily and is used for auditing purposes. Each timekeeper makes out a time sheet, which is inclosed in a stiff back cover of the loose-leaf system. These time sheets are cross-checked and audited by representatives of both the city of Montreal and the Montreal Tramways, and unless the "hours" and "amounts" shown on each timekeeper's sheet check, the sheets are held up for investigation. The payroll is made up from these time sheets.

Checker's Daily Report on Snow Removal. Fig. 2.—This form is used on the city of Montreal snow-removal work, and is a summary of the information and charges contained in the preceding form. This form enables the Montreal Tramways to make a daily audit as to the daily cost and the cost to date, and is a check against the preceding form. The total amounts shown on the form must check with the total amount shown on a summary of the time sheets. (Fig. 1.)

Checker's Daily Report on Labor Involved in Snow Removal. Fig. 3.—This form was designed for the purpose of checking in detail the working forces employed daily. It enables the Montreal Tramways to ascertain the total number of men of each class employed, not only on the city of Montreal snow-removal work, but also on the work done by the surrounding municipalities. It enables the Montreal Tramways to make a comparison of working the forces employed between the current and previous seasons. It also enables the Montreal Tramways to prevent the employment of an unnecessary number of men, as the timekeepers and inspectors who cover the different districts are familiar with the work being done and are able to render intelligent opinions as to whether the number of men employed is sufficient or not.

Form Used for Keeping Time on Special Snow-Removal Jobs. Fig. 4—This form is used by the Montreal Tramways section gangs and extra forces, for the purpose of checking time expended on the removal of snow from switches, intersections, yards and sidings.

SNOW REMOVAL, CITY OF MONTREAL PROPER

Yearly Costs and Snow Precipitation

Season	Total	Snowfall, Inches	Cost per Inch
1906-1907	$136,750.19	150.5	$908.63
1907-1908	213,379.89	151.9	1,404.73
1908-1909	219,308.89	138.8	1,580.03
1909-1910	109,232.78	97.2	1,123.79
1910-1911	160,511.34	119.9	1,338.71
1911-1912	186,617.07	107.5	1,735.97
1912-1913	131,497.07	102.5	1,282.89
1913-1914	204,777.26	105.9	1,933.68
1914-1915	151,845.39	86.6	1,753.41
1915-1916	256,366.15	103.2	2,484.16
1916-1917	310,309.06	105.3	2,946.90
1917-1918	328,366.32	129.6	2,533.69
1918-1919	213,257.89	104.6	2,038.79
1919-1920	304,980.72	109.2	2,792.86
1920-1921	198,012.81	61.4	3,224.96
1921-1922	212,714.80	80.6	2,639.14
Total	$3,337,927.65	1,754.7	$31,722.34
Average per season	208,620.47	109.7	1,982.64
Maximum	328,366.32	151.9	3,224.96
Minimum	109,232.78	61.4	908.63

Cost per street mile, 1921-1922, $2,352.59

Its initial purpose is to accumulate the costs of this particular section of the snow-removal work and is made out daily by the divisional roadmasters' clerks.

DATA GRAVITATE TO CENTRAL OFFICE

The system centers in the head timekeeper's office, where a large ledger is maintained. In this the distribution of snow-removal expenditure is entered daily, showing cumulative costs.

The following instructions to timekeepers will indicate the routine followed in the field:

SNOW SPECIAL
INSTRUCTIONS TO TIMEKEEPERS

The following are the instructions to be followed out by all timekeepers for the season 1922-23:

Montreal Tramway Company's timekeepers will meet city of Montreal timekeepers daily, at a starting point on each of the eight city sections convenient to both representatives.

Each timekeeper will cover his district and report at the City Hall at 9:30 a.m. for verification of time sheets.

Timekeepers will again cover districts in the afternoon and report at 4:30 or 5 o'clock at Room No. 207, Royal Trust Building, to make out daily district reports to be handed in to traveling checker when completed.

Montreal Tramways snow special timekeepers will be subject to the same rules and regulations as construction timekeepers.

Timekeepers should be at the starting point on each district not later than 7:15 a.m. in order to cover the ground before reporting at the City Hall.

Timekeepers working in the cities of Westmount, Outremont and Verdun and the municipalities of Montreal West, Montreal East and Pointe-aux-Trembles will get in touch with the timekeepers or representatives of the said cities and municipalities and obtain as much information as possible as to the location and number of men working, also the nature of the work being done.

All timekeepers, in the interest of the work in hand, must report immediately in writing any irregularities in connection with time, loading and size of snow boxes, distribution of men, etc.

Transportation tickets supplied to Montreal Tramways timekeepers are for their use only.

In the event of the absence from work of any timekeeper for a legitimate reason, it is necessary to notify the traveling checker several hours ahead of time so that arrangements can be made to provide a substitute.

Under no consideration whatsoever must any leniency be shown in connection with time.

A working day will consist of ten hours—from 7 a.m. to 6 p.m.—plus the regular allowance for overtime and Sunday work.

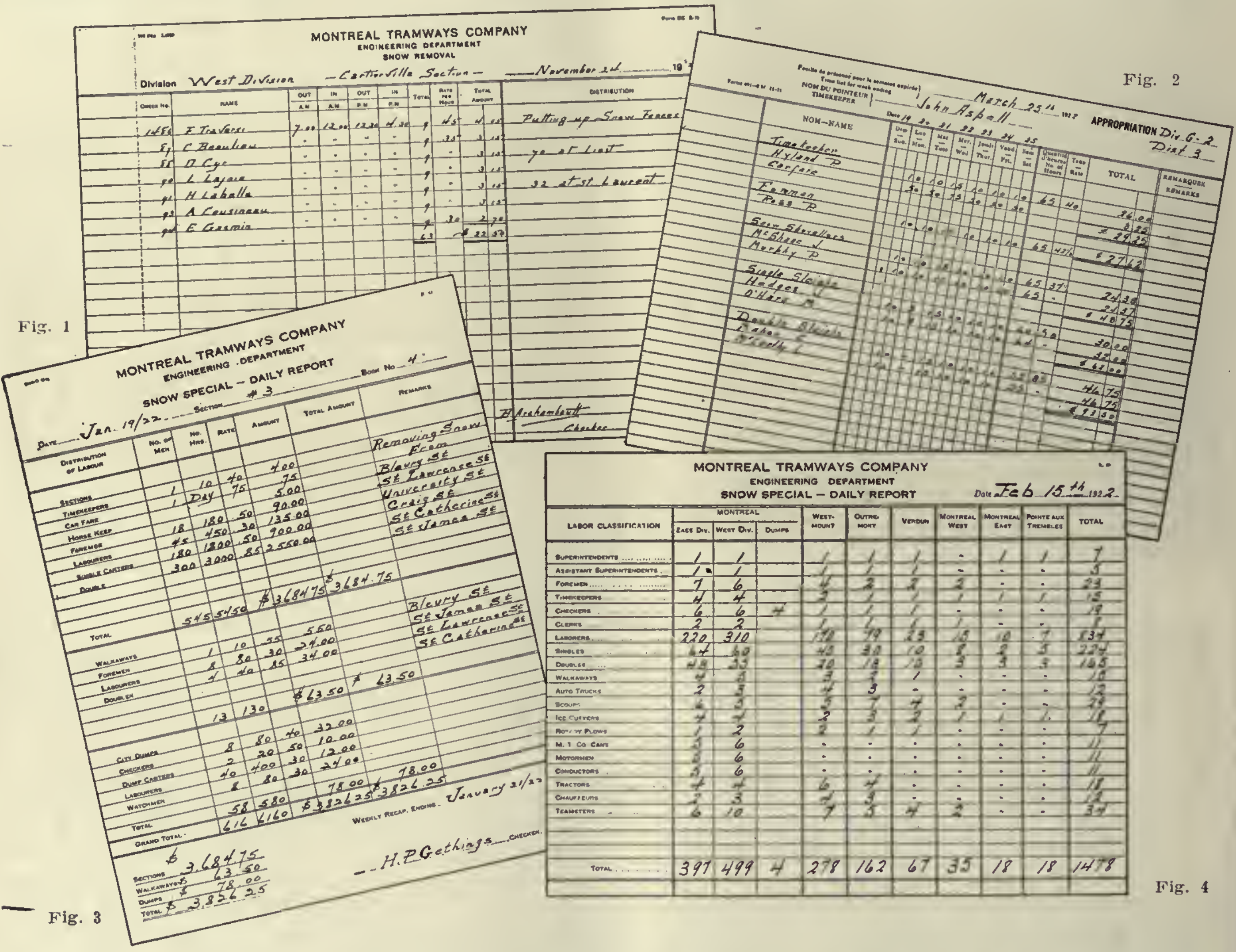


Fig. 1

MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
SNOW REMOVAL

Division West Division — Cartierville Section — November 2d 19

Check No.	Name	Out A.M.	In A.M.	Out P.M.	In P.M.	Total	Rate per Hour	Total Amount	Distribution
1456	F Traversi	7.00	12.00	12.30	4.30	9	45	4 05	Putting up Snow Fences
87	C Beaulieu	"	"	"	"	9	35	3 15	
88	D Cye	"	"	"	"	9	"	3 15	70 at Liest
90	L Lajoie	"	"	"	"	9	"	3 15	32 at St. Laurent
91	H Laballe	"	"	"	"	9	"	3 15	
93	A Cousineau	"	"	"	"	9	"	3 15	
94	E Gasmin	"	"	"	"	9	30	2 70	
						63		$22 50	

H Archambault
Checker

Fig. 2

Feuille de présence pour la semaine expirée
Time list for week ending March 25th 1922
NOM DU POINTEUR / TIMEKEEPER John Aspall
APPROPRIATION Div. G-2 Dist 3

Date 19 20 21 22 23 24 25

NOM—NAME | Dim. Sun. | Lun. Mon. | Mar. Tues. | Mer. Wed. | Jeudi Thur. | Vend. Fri. | Sam. Sat. | Quantité d'heures No. of Hours | Taux Rate | TOTAL | REMARQUES REMARKS

Timekeeper
Hyland P
Carfare
Foremen
Ross P
Snow Shovellers
McShane J
Murphy P
Single Sleighs
Hedges J
O'Hara M
Double Sleighs

36.00
3.25
$ 29.25
$ 27.62
24.38
24.37
$ 48.75
30.00
37.00
$ 67.00
46.75
46.75
$ 93.50

Fig. 3

MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
SNOW SPECIAL — DAILY REPORT

Book No. 4
Date Jan. 19/22 Section #3

Distribution of Labour	No. of Men	No. Hrs.	Rate	Amount	Total Amount	Remarks
Sections	1	10	40	4.00		Removing Snow From
Timekeepers	1	Day	75	.75		Blevry St
Car Fare				5.00		St Lawrence St
Horse Keep	18	180	.50	90.00		University St
Foremen	45	450	.30	135.00		Craig St
Labourers	180	1800	.50	900.00		St Catherine St
Single Carters	300	3000	.85	2 550.00		St James St
Double						
Total	545	5450		$3684.75	$3684.75	
Walkaways	1	10	.55	5.50		Blevry St
Foremen	8	80	.30	24.00		St James St
Labourers	4	40	.85	34.00		St Lawrence St
Doubles						St Catharine St
	13	130		$63.50	$63.50	
City Dumps	8	80	.40	32.00		
Checkers	2	20	.50	10.00		
Dump Carters	40	400	.30	12.00		
Labourers	8	80	.30	24.00		
Watchmen						
Total	58	580		78.00	78.00	
Grand Total	616	6160		$3826.25	$3826.25	

Weekly Recap. Ending January 21/22

Sections $3,684.75
Walkaways $63.50
Dumps $78.00
Total $3,826.25

H.P. Gethings Checker.

Fig. 4

MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT
SNOW SPECIAL — DAILY REPORT

Date Feb 15th 1922

Labor Classification	Montreal East Div.	Montreal West Div.	Montreal Dumps	Westmount	Outremont	Verdun	Montreal West	Montreal East	Pointe aux Trembles	Total
Superintendents	1	1		1	1	1	-	1	1	7
Assistant Superintendents	1	1		1	1	1	-	-	-	5
Foremen	7	6		4	2	2	2	-	-	23
Timekeepers	4	4		3	1	1	1	1	1	15
Checkers	6	6	4	1	1	1	-	-	-	19
Clerks	2	2		1	1	1	1	-	-	8
Laborers	220	310		172	79	23	15	10	7	834
Singles	64	60		42	30	10	8	2	5	224
Doubles	48	33		20	18	15	3	3	3	143
Walkaways	4	5		3	2	1	-	-	-	15
Auto Trucks	2	3		4	3	-	-	-	-	12
Scoops	6	5		5	7	4	2	-	-	29
Ice Cutters	4	4		2	3	2	1	1	1	18
Rotary Plows	1	2		2	1	1	-	-	-	7
M. T. Co. Cars	5	6		-	-	-	-	-	-	11
Motormen	5	6		-	-	-	-	-	-	11
Conductors	5	6		-	-	-	-	-	-	11
Tractors	4	4		6	4	-	-	-	-	18
Chauffeurs	2	3		4	3	-	-	-	-	12
Teamsters	6	10		7	5	4	2	-	-	34
Total	397	499	4	278	162	67	35	18	18	1478

Fig. 1—Checker's Daily Report on Snow Removal. Fig. 2—Timekeeper's Weekly Report of Working Time. Fig. 3—Checker's Daily Report on Labor Involved in Snow Removal. Fig. 4—Form Used for Keeping Time on Special Snow Removal Jobs.

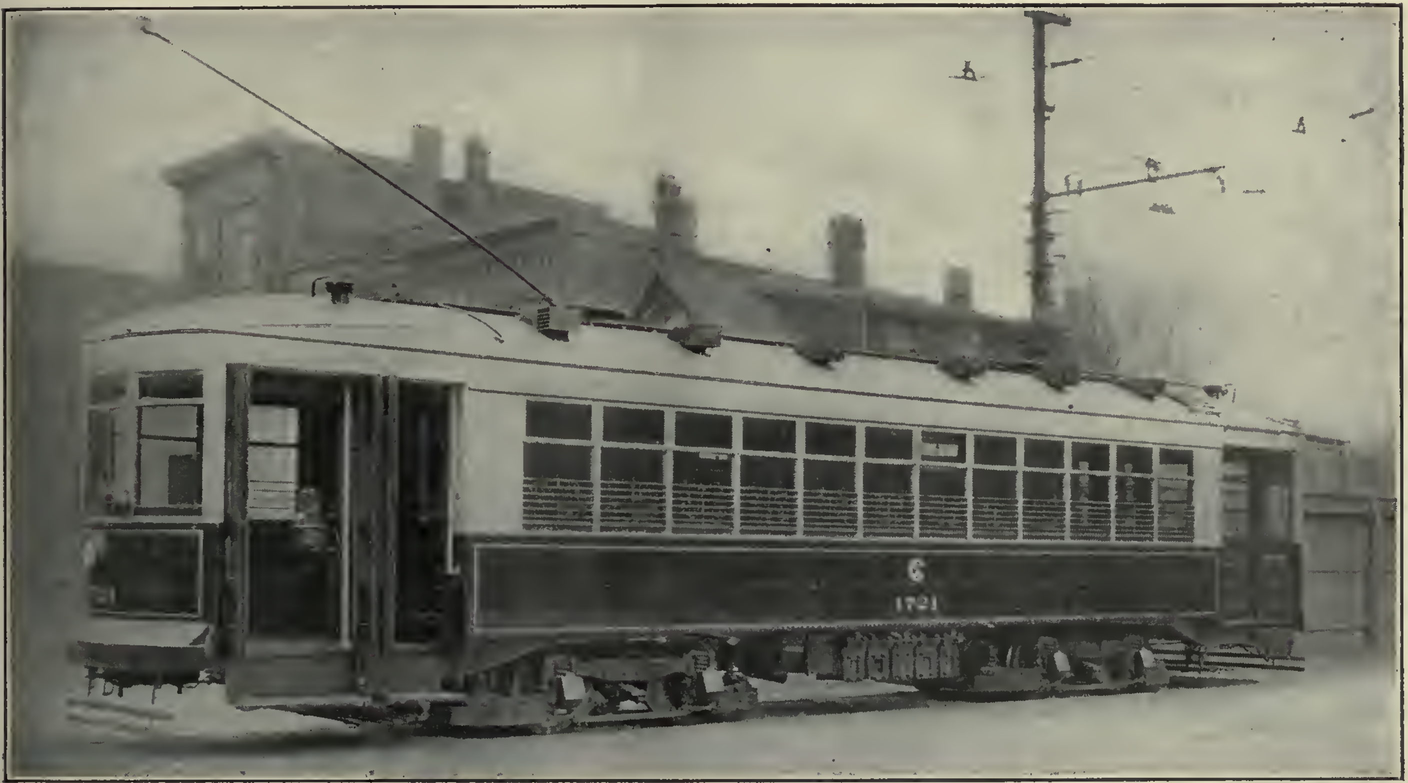
All time sheets must be audited under the supervision of the traveling checker.

All weekly accounts from municipalities must be checked in detail against Montreal Tramways timekeepers' daily time sheets and weekly recapitulation on the form head—"Snow Special Daily Report."

The accompanying table gives a summary of yearly costs and snow precipitation in the city of Montreal. These indicate that snow removal is considerable of a problem in Montreal. It is interesting to note from these figures that the cost is not directly proportional to the amount of snowfall, because wind, rain, the rise and fall of temperature and the amount of sunshine were contributing factors.

Chicago's Motor Car for Train Service

A Substantial Structure Has Been Combined with a Pleasing Finish and Appearance—Designed by the Railway for Hauling Trailers in All-Day Service—Uniformity in Cars Built by the Company and the Car Builders Reduces the Number of Parts to Be Carried in Stock



Note Streamlines in Body Design of New Chicago Cars for Hauling Trailers All Day

THE first of 169 new motor cars are now being put into service by the Chicago Surface Lines. Of this order, sixty-nine are under construction at the West shops of the company, seventy more are being built in the J. G. Brill plant at Philadelphia, and the remaining thirty are being built by the McGuire-Cummings Company.

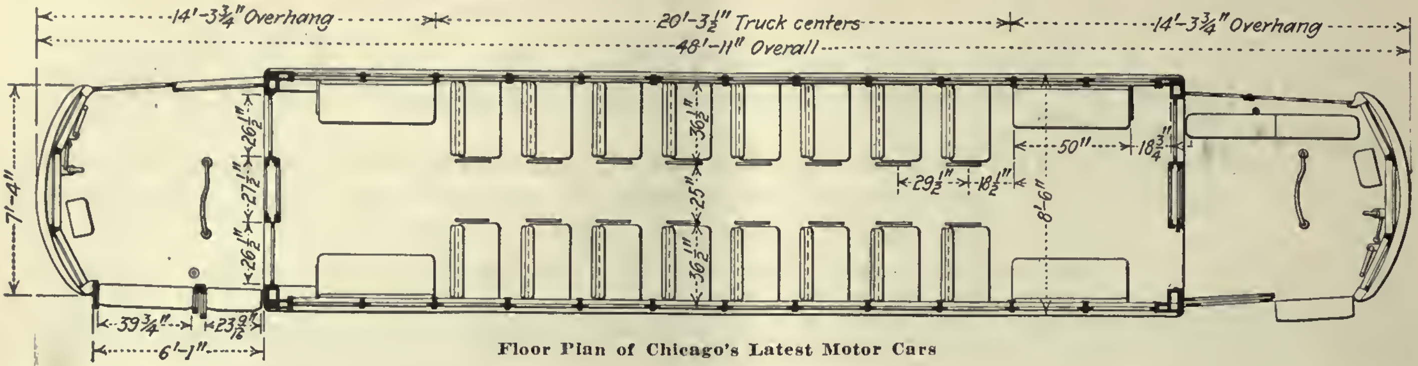
The Surface Lines has in the past designed and built a number of cars at its own West shops, among them being the double-truck "automatic door" one-man car. The company is, therefore, familiar with the problems which confront manufacturer and car builder. The car building capacity of the shop, which is about one car a day, was found to be insufficient to handle this entire order, so it was split into three parts, in such a way that each part will be completed at approximately the same date.

To have identical in construction the cars built in three different shops ordinarily is a difficult problem. It was successfully solved by the engineering division of the shops and equipment department under the direction of H. H. Adams. After the general design of the car had been decided upon a complete set of working drawings was made and duplicates furnished to the two car builders, so that when the cars are finished and delivered they will be exactly alike. By doing the detail design work the Surface Lines was able to utilize many existing standard parts in the new cars and thus avoid making a large number of new patterns. This results also in the elimination of duplicate stock parts, a saving which in itself quickly absorbs the entire cost of preparing the additional drawings.

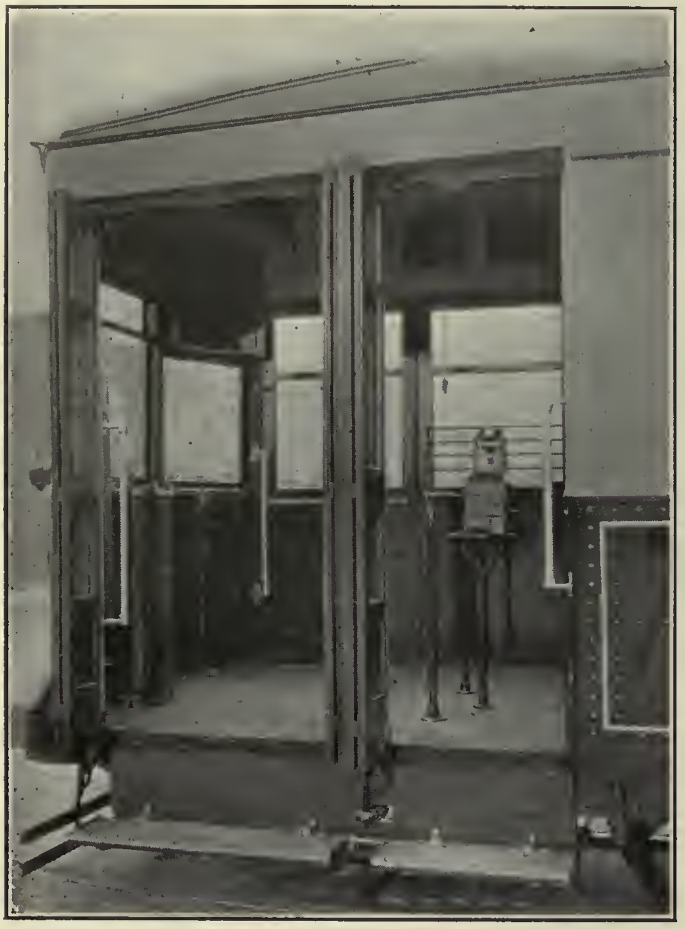
The car is of the double-end type and corresponds in general appearance to the arch roof cars in service on the Surface Lines. Streamline effect, together with the careful selection of finish and trimming, has resulted in a pleasing appearance. The company's new standard color scheme has been used, which is red below the belt rail and cream color above. The interior finish of the car is cherry with a buff ceiling, which gives approximately 80 per cent of the reflection of ivory white and is considerably more economical to maintain.

Ruggedness is the outstanding feature of the car, each part being so built that it will stand up with minimum maintenance under heavy city service requirements. Study of the distribution of weight among the various parts has resulted in a car weighing 46,900 lb., which is 8,500 lb. less than the present cars used for trailer service. The latter has sufficient capacity to haul a trailer during the rush period, but the new car has been designed to haul a trailer all day if necessary. The equipment consists of four GE-275 motors with K-35 control, provided with line switches interlocked with the doors. The motors are mounted on Brill 51-E trucks with 28-in. wheels. All parts were specified to be of American Electric Railway Engineering Association standard as far as possible.

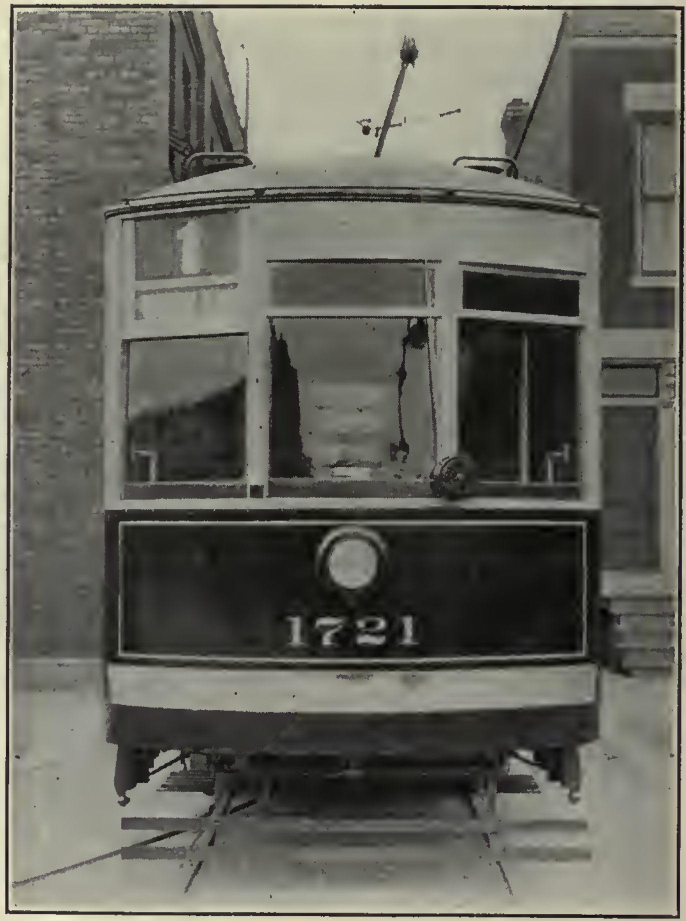
In order to insure freedom from electrical troubles



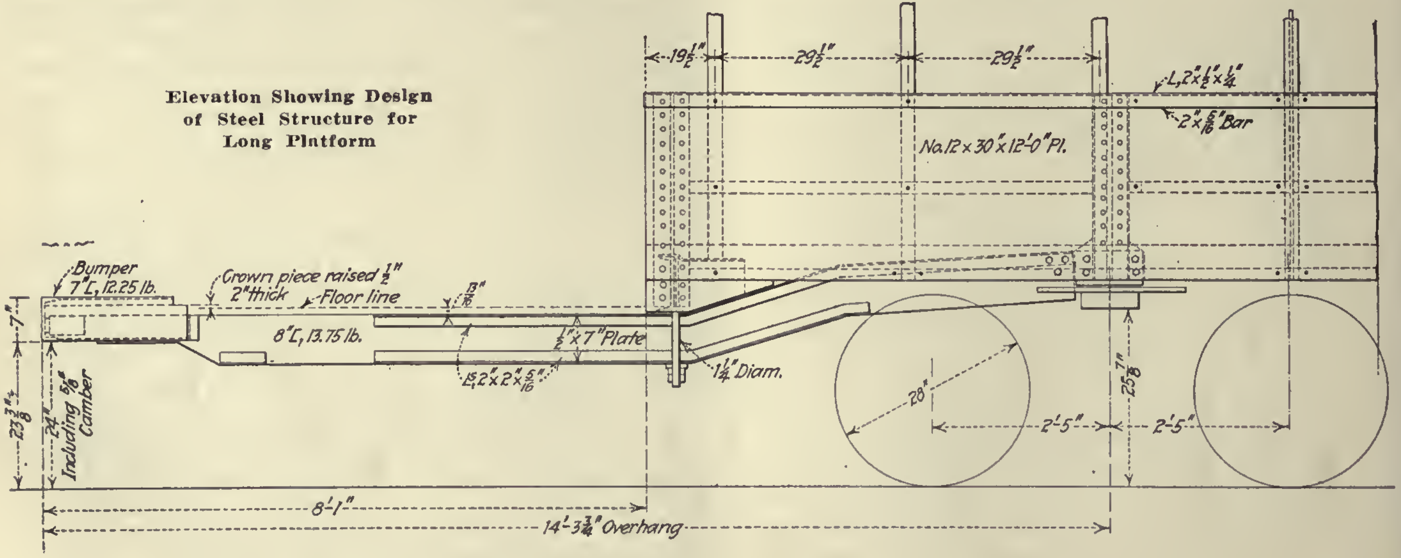
Floor Plan of Chicago's Latest Motor Cars



Platform, Door and Step Arrangement—Aluminum Grab Handles Are Used



Head-On View Shows Fender, Sign, Headlight and Trolley Catcher Equipment



Elevation Showing Design of Steel Structure for Long Platform due to creepage around the standard type porcelain insulators which are used for mounting the line switch and control rheostats, a system of double insulation is used; i.e., the apparatus is insulated from its supports by one set of insulators, and the supports in turn are insulated from the car frame either by a second set of porcelain insulators or by hard maple mounting strips. This method of mounting the apparatus is shown in an accompanying illustration.

The rear doors are of the folding type and are equipped with National Pneumatic door engines. They are operated simultaneously by a single engine located above the door header. The conductor's control of the valve is mechanical. The front right-hand door is of the sliding type, being operated manually by the motorman. Curtains are so mounted that they are exposed when rolled up and, therefore, are easy to clean. The Surface Lines' standard system of ventilation, manufactured by the Railway Utility Company, is employed. Automatically regulated intakes are located at the four corners of the car body, with eight exhaust ventilators placed between on the roof. Two ventilators are provided for each platform.

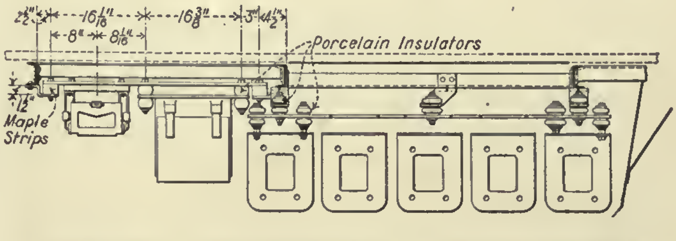
The middle part of the car has sixteen reversible cross-seats manufactured by the J. G. Brill Company, with full spring cushions and thin type backs. They are rattan covered. The width from the inside lining over the aisle plate is 36½ in., and the seat cushions measure 17 in. x 34 in. Longitudinal seats accommodating three persons each are placed in the ends of the body. A folding seat for four persons is provided on the front platform at the left side of the car, making a total seating capacity of forty-eight. The platform layout is of the "pay-as-you-enter" type, which is standard on cars of this company.

The general dimensions of the car are shown in the accompanying table.

PRINCIPAL DIMENSIONS OF CHICAGO CAR

Length over bumpers	48 ft. 11 in.
Length over corner posts	32 ft. 9 in.
Width over all	8 ft. 6 in.
Seating capacity (body)	44
Seating capacity (platform)	4
Total seats	48
Width of aisle	25 in.
Door opening in clear (rear entrance)	3 ft. 3¾ in.
Door opening in clear (rear exit)	1 ft. 11 9/16 in.
Door opening in clear (front exit)	2 ft. 5⅛ in.
Height, rail to trolley boards	11 ft. 7½ in.
Height, rail to floor	3 ft. 1½ in.
Height, rail to side sill	2 ft. 7½ in.
Height, rail to step	15⅛ in.
Height, step to platform	13 3/16 in.
Height, platform to body floor	9 3/16 in.
Side post centers	29½ in.
Wheelbase of truck	4 ft. 10 in.

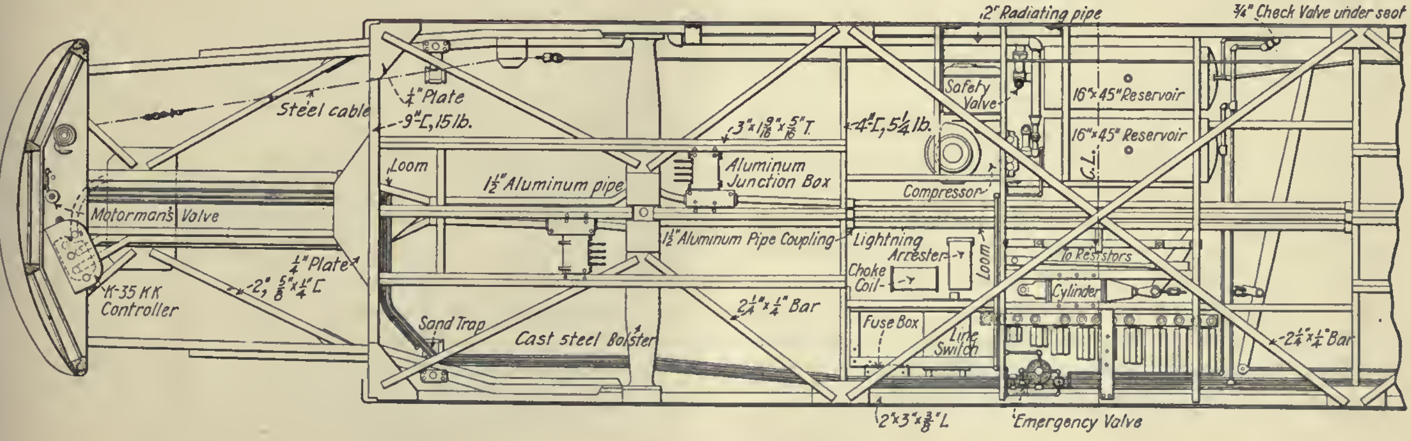
The plate girders forming the sides of the car are of 12-gage steel reinforced at the lower edge with 3-in. x 2-in. x ⅜-in. angles and at the top edge, under the belt rail, with 2-in. x 1½-in. x ¼-in. angles and a 2-in. x 5/16-in. bar. The girder is further strengthened with 1½-in. x 1½-in. x ⅛-in. seat support angles placed longitudinally half way between its bottom and top edges and cut for the side posts, which are strapped and bolted to the plate girder.



Double Sets of Porcelain Insulators for Rheostat Supports

The platform knees are 8-in. 13.75-lb. channels, reinforced at the point of greatest stress by web plates and angles. Bumpers are of 7-in. 12¼-lb. channel, with the flanges turned in. The end sills consist of 9-in. 15-lb. channels secured to the side structure with gusset plates. Channels are used for the main body cross sills, being of 4-in. 5¼-lb. section. The frame is braced from bolster to bolster with continuous diagonal braces of 2¼-in. x ¼-in. flat bar. Further diagonal bracing is installed between the bolster and the end sills. Bolster struts on the side girder are made of two angles riveted together to form a "Z" section, and are fastened to the bolster by turned bolts with a driving fit. The trapdoor openings are framed with 3-in. x 3-in. x 5/16-in. tees, having the vertical stem cut to 1 9/16-in. and run longitudinally either side of the steel bolster.

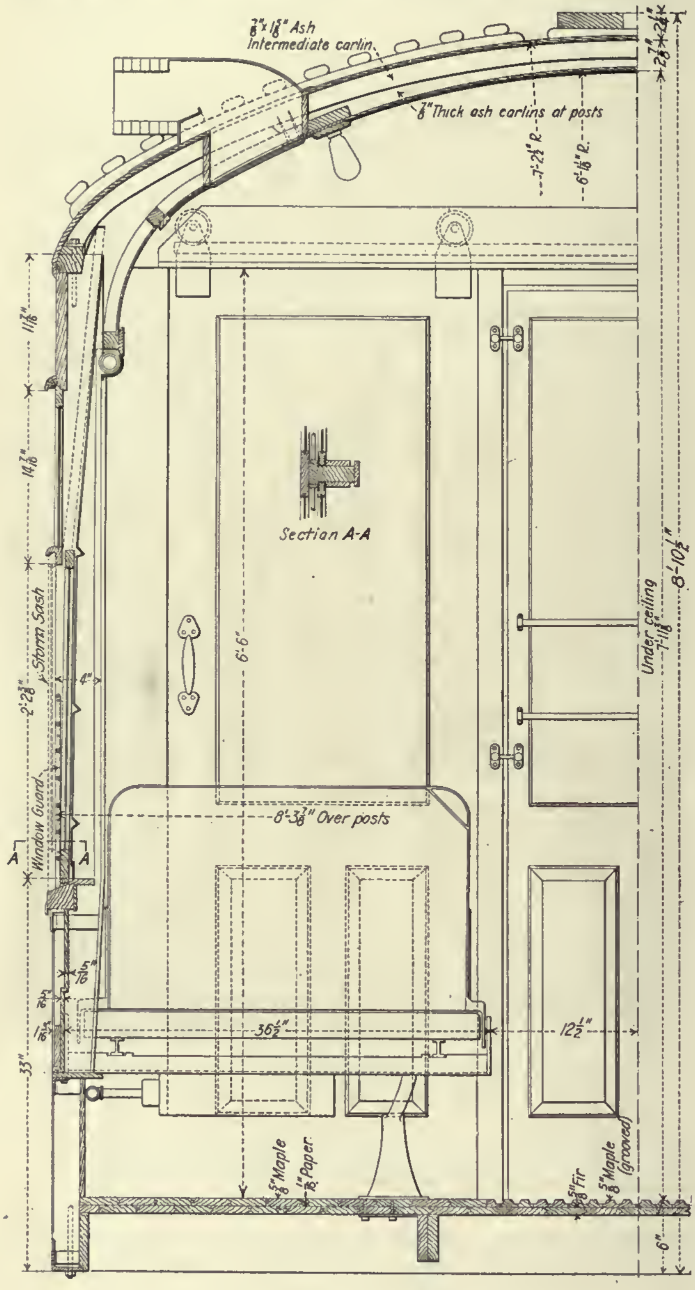
The roof is supported on ⅜-in. x 1½-in. steel carlins set on edge and bolted to 1¼-in. ash carlins over each pair of side posts. Intermediate carlins of 1¼-in. x 1⅝-in. ash are provided between the posts. The roof is ⅜-in. tongued and grooved poplar, covered with No. 8 National prepared roofing. The headlining is ¼-in. Agasote in the center and 3/16-in. Agasote at the sides. Special spring clips for holding the ceiling signs are provided at each end of the car, in the manner standard on the Chicago Surface Lines. Two continuous wood purlins are installed, to which the body lamp sockets are fastened directly by means of special Benjamin mounting plates. The ash side posts are reinforced with ⅜-in. rods, bolted to the lower girder angle, and extending upward through the feet of the steel carlins.



Outline of Steel Frame and Location of Principal Equipment

The body side top plate is of yellow pine, and the letterboards are of ⅞-in. poplar.

The top sash is continuous, 11/16 in. thick, and is fastened to the outside of the side posts. The lower rail of the top sash is provided with a lip, to receive the top of the storm sash. These are made up in two-window sections and are of ⅝-in. thick cherry, fastened to the side posts. The lower side sash are also of ⅝-in. cherry, provided with brass wearing channels on the stiles and are arranged to lift. O. M. Edwards sash fixtures are used, with a lock on the right-hand side of each sash and a compression brake on the opposite side.



Cross-Section Through Car

The window guards are made up of No. 18 gage brass tubing of ⅜ in. inside diameter. These, however, are made up in a single-window section and are fastened permanently between side posts. By this arrangement they form an integral part of the car structure and add materially to the stiffness of the side frame, and the storm sash can be applied without removing them.

The double floor consists of two ⅝-in. thicknesses. The lower is of fir and the upper of maple, separated by tarred felt. In the aisle the top floor is rabbeted, so as to eliminate the use of separate floor strips.

WEIGHTS OF PRINCIPAL DETAILS OF CHICAGO CAR

Body (less electrical equipment)	20,735 lb.
Control and wiring	2,025 lb.
Two trucks complete No. 51-E Brill	14,500 lb.
Motors with pinions, gears, gear cases, axle collars and axle bearings	9,640 lb.
Total light weight	46,900 lb.

In accordance with recent Surface Lines practice, the stationary platform stanchions are of aluminum. In addition to these, the vestibule grab handles are of aluminum pipe, with end castings of special aluminum composition. The use of this material effects not only a saving in weight but also an improvement in the appearance of the vestibule.

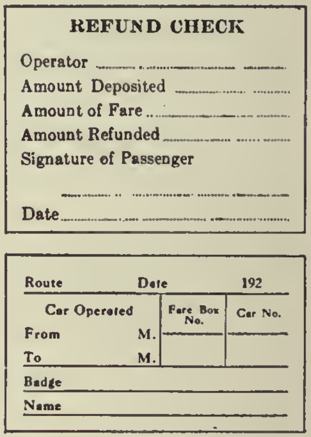
Every effort has been made to keep down the weight of the car without weakening its structure. The control wiring has been placed in Duraduct except where it passes under the trapdoor openings, where it is inclosed in aluminum conduit. Aluminum junction boxes are provided for the motor leads. All auxiliary wiring under the body floor is in aluminum conduit, as is also the heater wiring along the truss planks. Auxiliary wiring above the flooring is in Duraduct.

The accompanying table shows the distribution of weight.

Refund Check Avoids Disputes

WHERE fare boxes are used, a passenger occasionally drops more than the required amount of money into the box. While this may be detected while the coins are lying on the table in the fare box, the conductor has no means by which he can extract the coins and give them back to the passenger. Usually, the conductor directs the passenger to apply to the company's offices for a refund.

On the lines of the Beaver Valley Traction Company, New Brighton, Pa., disputes of this character have been eliminated entirely by the use of the refund check illustrated. In case the passenger deposits more than the correct fare, he can receive the difference back at once, upon application to the conductor, provided he signs the refund check. In this way he has no further complaint to make to the company. The signature will deter the passenger from making a fraudulent claim.


REFUND CHECK

Operator

Amount Deposited

Amount of Fare

Amount Refunded

Signature of Passenger

Date

Route Date 192

Car Operated		Fare Box No.	Car No.
From	M.		
To	M.		

Badge

Name

At Top, Conductor's Receipt for Refund. At Bottom, Credit Slip Dropped in Fare Box

The conductor has the signature of the passenger on the refund check to show that he has paid out money. This check is turned in along with the daily trip sheet.

In order that the cash in the locked fare box will be kept straight with the conductor's record, and that he will get the refund, he fills out another small form, as shown, and drops it in the fare box.

No bookkeeping is involved, as the refund check and the credit slip deposited in the fare box take care of the overpayment automatically. The passengers are much better satisfied with the arrangement than when it was necessary for them to apply at the company's office for refund.

Securing a Favorable Insurance Rate

On Chattanooga Property Single Broker Acts as Intermediary Between Utility and Underwriters, Thus Simplifying Procedure and Providing for Equitable Distribution of Risk

By W. C. Campbell

Assistant to the Vice-President,
Tennessee Electric Power Company, Chattanooga, Tenn.

THE rate fixed upon a piece of property by an inspection bureau of the fire underwriters is the best index we have of the probability of a fire loss. At the same time no public utility can be fully compensated for the loss occasioned by a severe fire by money collected on its fire insurance policy. The financial houses handling the company's securities not only want to know that the property is insured, but are favorably impressed with a low rate. This, like the clean shop, low lubrication cost, orderly store room and good accident damage record, is commonly considered an indication of general good management.

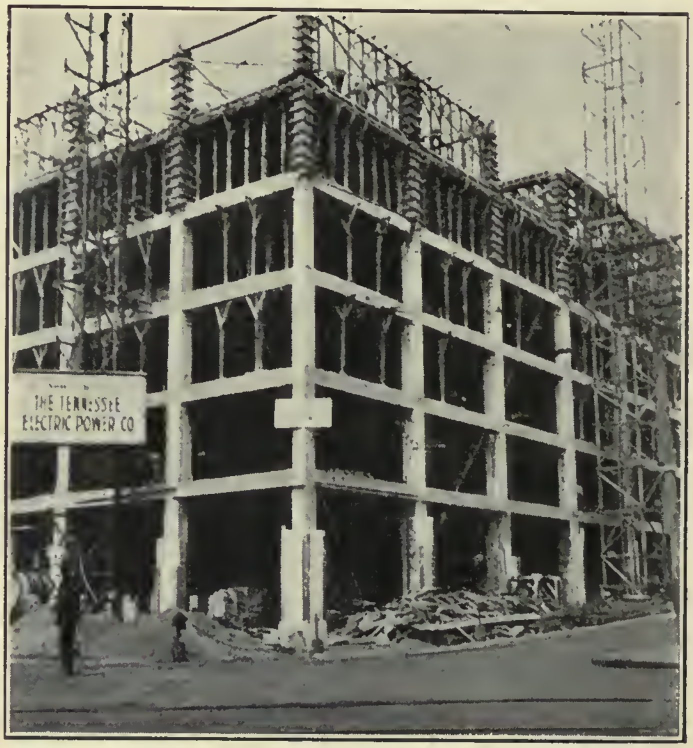
The insurance premium is relatively small as compared with other items making up the total operating expense of a public utility, and is not especially attractive to the operator who is looking for a place in which to make a showing by reduction in expenses. However, the actual saving in dollars output will often provide a handsome return for the time and effort given the subject. Attention to insurance matters, like safety-first work, should more than pay its way and show a net gain in employee morale, public opinion, etc., as well as render more remote the probability of a fire catastrophe.

HOW PREMIUM REDUCTIONS WERE SECURED IN TENNESSEE

Some features of our experience in Tennessee may be of interest to those who have never given personal attention to insurance matters. This company has four hydro-electric plants which are now covered with more than two and a quarter millions of insurance on the 80 per cent co-insurance basis. For a long time it was felt that the risk of fire at these plants was so slight that no insurance was necessary. However, in 1920 we called for an inspection and rating with the result that we were quoted rates ranging from 71 cents per hundred to 19 cents on the buildings and 76 cents to 24 cents on the contents, the average being 36.1 cents per hundred, and the premium on a one-year-term basis $8,600.

Obviously either the insurance companies' basis of rating was at fault, or our estimate of the hazard was wrong. Probably both were out of line. However, we called for a reinspection and in January, 1921, were quoted rates on the buildings ranging from 48 cents to 16 cents and contents 54 cents to 21 cents, with an average rate of 33.9 cents, and a premium of $8,075. Effective May 1, 1922, we got the benefit of the work done by the National Electric Light Association insurance committee, when rates were named ranging on the buildings from 38 cents to 6.9 cents and on contents from 40.3 cents to 13 cents, the average rate being 22.7 cents and the premium $5,400, or a saving of 33 per cent over rates previously in effect.

We have recently gone over the property again with the result that we secured further reductions effective June 1, 1923, the rates on the buildings now ranging from 23.8 cents to 6.9 cents and contents from 24.4 cents to 11.8 cents, the average rate being 16.2 cents and the premium on a one-year-term basis $3,850. It will be noted that the saving over the period described on this part of our property alone was $4,750, while the average rate was reduced from 36.1 cents to 16.2 cents. Of this the N.E.L.A. committee should have credit for $2,675. No changes have been made in plant which would not have been authorized as a matter of good practice regardless of premium savings, and no expense has been involved other than the time required to give close attention to the details.



Construction Like That of This New Headquarters Building Will Bring Minimum Insurance Rate

The Tennessee Electric Power Company was formed last year by the consolidation of the Tennessee Power Company, the Chattanooga & Tennessee River Power Company and the Chattanooga Railway & Light Company, the railway division of which was brought from under receivership at the same time. When all the fire insurance policies were gathered together it was found that there were a great many of them, that they were written for various periods and expired at all sorts of dates. The thing was unwieldy and the need was evident for a rearrangement along lines which would make it easier to keep track of it. Our property comprises the four hydro-electric plants previously mentioned and two steam plants, with substations scattered over a wide area, the railway and light and power distribution systems in Chattanooga, offices, stores, distribution systems in smaller towns, employee camps at the power plants, and miscellaneous residences, etc., acquired in times past with power line rights-of-way.

A study was made of the whole situation, involving the rerating of a large number of buildings, and the whole business was thrown into a general form. All outstanding policies were canceled pro rata and the insurance was rewritten through local agents for a three-year term. Our present policy is to distribute fire insurance business rather broadly among the local agents, who in turn place it with the companies they represent, and consequently we still have a considerable number of separate policies and all are involved in the settlement of even a small loss. To assist in handling all matters between agencies and insurance companies we have written our insurance through one agency acting as broker. The broker retains a portion of the regular commission as his compensation. The full premium is paid to the broker and losses are settled for by him, thus relieving us of a lot of detail which is better handled by those in the insurance business, while we retain direct control of all those matters of interest to us.

The Tennessee Electric Power Company

As used in this policy, it is understood and agreed that:

DIVISION A covers on buildings, their additions and extensions, sheds and fences, and including all permanent fixtures not otherwise insured, plumbing, heating apparatus, awnings, attachments and appurtenances, and including with power houses small gate hoist buildings at top of dam, and trestles and tracks alongside and inclines adjoining power house, as described and covered in items below.

DIVISION B covers on all machinery, fixed and movable, including boilers and engines and attachments, shafting, belting, pulleys, hangers, and all electrical equipment (not otherwise insured), including dynamos, generators, boosters, switches, wiring, lamps, and the complete electrical equipment of and in buildings; and office, store, and dwelling furniture, fixtures and equipment and supplies, including maps and drawings, wagons, harness, horses and mules (no one animal to be valued at over $300.00), tools, dies, implements, models, patterns, their own or for which they may be legally liable, and employees' clothing, all while contained in buildings or adjacent thereto, as described and covered in items below.

Item No.	Occupancy	Location	Construction of Building	Division A	Division B
		ATHENS			
1	Storehouse	......	......	$75	......
		CLEVELAND			
2	Machine shop	......	Brick	4,500	$8,000
3	Storehouse	......	Iron clad	1,500	......
4	Substation	......	......	1,200	2,000
5	Switching station	......	......	3,000	2,500
6	Storeroom and office	No. Side Raht St.	Brick	2,500	1,500
7	Garage and storeroom	No. Side Raht St.	Brick	2,000	......
8	Store and office	711 31st St.	Brick	......	400
		CHATTANOOGA			
9	Car house	Third, Market and Broad Sts.	Concrete and brick	96,000	1,920
10	Repair shop	Third, Market and Broad Sts.	Concrete and brick	38,400	22,400

Head of a Sheet Covering All Property to Be Insured, Printed for Convenience in Negotiating Insurance. Complete Table Includes 114 Items

While it is rather general practice to cover properties of this kind by a general form both for ease in handling and for the purpose of offering the insurance companies a diversified risk, there are certain features in our form which may be of interest. We have approximately a half million dollars of outdoor substation equipment which takes a 7-cent rate, or if written for a three-year term, a rate of less than 6 cents per hundred. The likelihood of fire is not great, but we have considered it worth covering on these terms. Equipment of this type is subject to relocation from time to time and we have therefore blanketed the whole equipment in a lump sum so that any piece is covered while at any one of the locations specified in the policy. We have some $300,000 worth of supplies and spare parts distributed among a number of locations. The values at the various points constantly fluctuate, while the total remains reasonably constant. We have covered these supplies in a lump sum by a provision in the general form protecting us against loss so long as they are in or near any of the buildings owned by the company. This permits us to shift our supplies from point to point as occasion may demand. Supplies on the line wagons or on the job at a distance from our buildings or at a railway station, etc., are covered by a blanket provision protecting us against loss of any of our supplies to the extent of $1,000 while they are anywhere in the state of Tennessee.

In attacking the rate problem we have never been opposed by any insurance interest and have found the rating authorities more than willing to meet us half way whenever we have shown a serious interest. The inspection bureau is ready to furnish data showing just how any rate is arrived at, and it may readily be determined just what saving can be made by correcting the defects which they point out. Many needed improvements can be paid for by savings in the insurance premium.

Electric Locomotive for Interurban Freight Service

Field Control Motors with Forced Ventilation Give High Continuous Rating—Locomotive Will Haul 1,180 Tons on Level Tangent Truck

A LOCOMOTIVE designed for transporting short-haul freight has been built for the Interstate Public Service Company, Indianapolis, by the Westinghouse Electric & Manufacturing Company. The conditions existing on this electric line are similar to those to be found on many interurban lines and will show very well the necessity for a locomotive which is particularly adapted for interurban service. It is necessary for this railway to haul freight cars through the city streets at several points, and on account of this fact the width of the locomotive must be limited to 9 ft. Previous to this time, practically all of the locomotives built for use on interurban lines had a cab 10 ft. in width. This severely handicapped freight haulage through city streets.

The trucks are of the rigid bolster equalized type and built with rolled steel end and side frames, located outside of the wheels, which are 36-in. rolled steel.

The brake equipment consists of air and hand brakes operating on all wheels. The rigging is actuated through a radial type brake beam which permits effective braking on short curves. The equipment is an adaptation to electric locomotives of the standard steam locomotive air-brake equipment. It includes an independent straight air brake for handling the locomotive alone, together with a quick-action automatic brake for both locomotive and train. The length of the brake lever and diameter of brake cylinder mounted underneath the cab are proportioned to give a total shoe pressure of 75 per cent of the weight of the locomotive with 50 lb. cylinder pressure.

The cab is substantially built. Two windows are provided on each side, with a door and two stationary windows at each end. On the rolled-steel checker-plate platform at one end of the cab is mounted a sand box, an air reservoir and a blower housing. On a similar platform at the other end are a sand box, an air reservoir and a locomotive bell. The underframing is built up of rolled steel channel side and center sills with cast-iron bumpers.

ELECTRICAL EQUIPMENT

The locomotive is equipped with four 100-hp. 600-volt field control motors arranged for forced ventilation and using a gear ratio of 17:60. The low-speed type of motor used is very well adapted to freight haulage in that it is able to develop large tractive efforts and drawbar pull without drawing excessive current. Forced ventilation is provided by the use of a blower runner mounted directly on the shaft of a 600-volt blower motor. The blower motor is mounted just inside of the cab at the No. 2 end, so that the shaft extends through the cab sheeting for the fan mounting just outside. The fan is inclosed by a housing which is provided with louvers, assuring a supply of dry air for the motors. The space between two of the center sills is closed with a sheet-iron plate, thus forming a duct for carrying the air from the blower to openings adjacent to each motor, from where flexible canvas connections conduct the ventilating air to the motors.

LOCOMOTIVE RATINGS

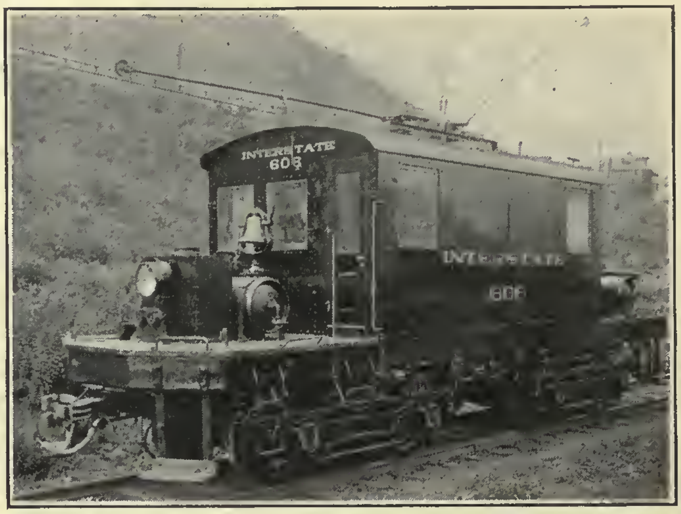
	Tractive Effort Lb.	Volts	Speed M.P.H.	Ventilation
For one hour with motors on short field.....	13,880	600	11.3	Forced
	13,000	600	11.5	Natural
Continuous with motor on short field......	9,000	600	13	Forced
	5,900	600	15.3	Natural
Maximum capacity.....................	25,000			
Normal adhesion for starting duty only...	25 per cent of locomotive weight			
Maximum safe speed....................	35 miles per hour			

The standard Westinghouse electro-pneumatic control is used. Sixteen type UP unit switches are mounted between angle steel equipment supports located inside of the No. 1 end of the cab. The main controller and the reverser are provided with interlocks so that the switches cannot be closed unless the reverser is either in the forward or reverse operating position.

All of the electrical apparatus is mounted in a compartment approximately 4 ft. long and 6 ft. wide, extending from the floor to the roof of the cab. The accelerating resistors are mounted near the top of this compartment.

Ventilation is obtained through the roof by means of two ventilators. The unit switches are mounted directly beneath the grid resistors, while the reverser, overload relay, motor cutout switch and other apparatus are mounted so as to be accessible from both the front and rear compartments, which simplifies the maintenance and inspection. The equipment compartment is inclosed by removable doors or covers to prevent accidental contact of the operator with any of the electrical apparatus. A sixteen-notch master controller gives a large number of accelerating steps, so that a very heavy trailing load may be started without abuse to the equipment and with a minimum of wheel slippage.

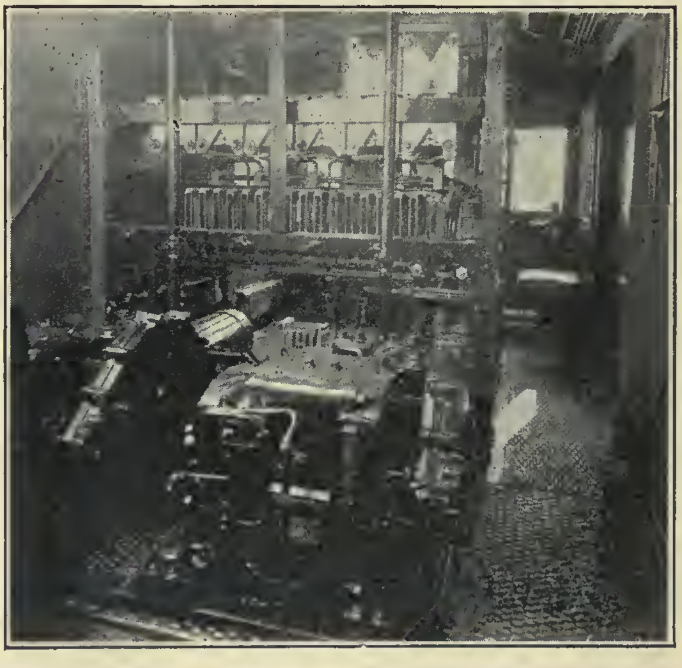
The air compressors are mounted in the space adjacent to the equipment compartment and the installation or removal is facilitated by a removable section of each side of the cab. They supply air at 85 to 100 lb. pressure to the reservoirs mounted on the platforms at each end of the cab. Cooling pipes are inserted between each compressor and the air reservoir and also between the two reservoirs. A reducing valve provides 70 lb. pressure for the control reservoir for supplying air for the control apparatus, sanders, whistles and bell.


Locomotive for Interurban Freight Service on the Interstate Public Service Company's Lines

The locomotive for the Interstate Public Service Company is arranged for double-end operation and has two air compressors and a blower equipment. The accompanying table gives the ratings of the locomotive.

At the continuous rating, with motors operating on short field and with forced ventilation, this locomotive is capable of hauling a trailing load of approximately 1,180 tons on level tangent track.

The general design of this locomotive is standard, so that similar machines may be built for single- or double-end operation, and may have one 50-ft. compressor or two 35-ft. compressors, with or without forced ventilation and may be provided with or without multiple-unit control.


The Air Compressors Occupy the Foreground with Unit Switches and Grid Resistors in the Rear. Directly Behind the Compressor on the Left Is the Reverser

Akron People Respond to Appeal for Higher Fare

Railway Advertises that "The Actual Cost of Your Car Ride Is 5.7 Cents; Please Help Meet It by Dropping 6 Cents in Fare Box"—Twenty per Cent of the Riders Pay the Extra Cent Voluntarily

By E. B. Atchley
Northern Ohio Traction & Light Company, Akron, Ohio

FOR three weeks this appeal has been made to the car riders of Akron by the Northern Ohio Traction & Light Company, and is still being made through newspapers, car cards and in the company's publication—the *N. O. T. & L. News*. For two weeks prior to the date fixed for the payment of the "Voluntary 6-cent fare" advertising explaining the cost of the ride was presented the public.

The result has exceeded the expectations of the company, an average in excess of $200 daily coming in at this time in pennies from approximately 100,000 passengers carried.

Day by day the number of pennies that fall into the fare box is increasing. It is almost impossible to make an accurate check for the reason that the Cleveland fare box is used and there is no registration.

On Sept. 1, however, the company placed "voluntary 6-cent tickets" on sale. Many business firms bought tickets, sending in their checks, and nearly 1,000 car riders bought strips the first day. The tickets were put in strips of 5 and sold for 30 cents a strip. Since the first day there have been additional purchases.

The action of the company in appealing to the people of Akron for relief follows negotiations for a new franchise which have been in progress for years without results. Time after time the company has been on the point of getting a new franchise-contract through the Council for submission to the people, the city charter requiring submission, but at the last moment something has arisen to block progress.

The last proposal of the company was for a 6-cent cash fare, nine tickets for 50 cents with city control of service and a twenty-five-year agreement. This was finally rejected by the city and with it came the demand for a short-term franchise and a straight 5-cent fare with free universal transfers. The company could not accept this.

Figures were submitted by the company showing that the total cost of carrying passengers in the city, including a fair return on the investment, and allowing for depreciation, was 7.2 cents. Figures were also submitted to the public utilities committee of the City Council showing that the *actual cost* of the ride, excluding depreciation charges and interest on the investment, was 5.7 cents, divided as follows:

	Cost per Passenger, Cents
Wages	2.3384
Equipment	.8835
Power	.7818
Track	.7299
General and miscellaneous	.7073
Taxes	.2558
Traffic	.0113
Total	5.7080

At that time many persons said that the company was entitled to its demand of 6 cents cash, or nine tickets for 50 cents. Others believed there should be a transfer charge.

In the recent municipal primary campaign, one of the candidates stood boldly for a flat 5-cent fare and a short-time contract. This candidate was defeated. Another candidate, who has always opposed the company although he said nothing in the campaign, was defeated for nomination.

The company made it plain, however, when it began advertising, that the 6 cents was necessary to continue the *present service* and the action had no political significance. It pointed out that the present service far exceeds the service provided for under the terms of the old franchise, which expires on Feb. 1, 1924.

The action of the company in putting tickets on sale caused an uproar among the politicians and some city officials, including the Mayor. The Mayor sought to invoke the aid of the city's law department to prevent the sale of five tickets for 30 cents, and one or two councilmen asked the same department if something couldn't be done to stop the advertising.

"The city is getting a black eye in this advertising," declared Councilman Rose. "We are being made the laughing stock of visitors. Something must be done."

The legal department is reported to have expressed an opinion that gave little satisfaction to the protestors. "There's no law against honest advertising, and the people can pay what they want to pay in excess of the franchise fare," is the substance of what the law director said to the Mayor.

And that settled that!

Now it is said a committee of citizens has again taken up the question of a new franchise in the hope of ending the controversy. What has been done along this line, if anything, no one seems to know.

The advertising used has been carried in the company's magazine, the *N. O. T. & L. News;* in sectional strips on the upper ends of the cars, posters inside the cars, in newspapers and local magazines.

The figures which were submitted included nothing for depreciation and no interest on the investment. These facts were clearly pointed out in all advertising.

The company also showed the old franchise service provisions in comparison with the service now being supplied. It pointed out that 120 new city cars and twenty-four buses had been placed in service in the last few years; that lines had been extended, rebuilt and double tracked; that a new line had been constructed across the $2,000,000 viaduct which bridges the Cuyahoga Valley, and in many other ways the system had been improved to enable the company to provide a betterment of service. At the same time the company declared:

"We have lost money on the Akron City system for years. Steadily adding to the investment may have seemed to some not good business, but—

"We have never lost faith in the people of Akron. We firmly believe the people of this city do not want this company, or any other company, to operate for less than cost."

Before the appeal was made to car riders to voluntarily pay the additional penny, talks were made to the company's trainmen. They were urged to express the thanks of the company to patrons paying 6 cents. This co-operation has undoubtedly been beneficial.

When Detroit went to a 6-cent cash fare and the Cleveland ticket fare was abolished the company took the opportunity to point out rising labor, material and fuel costs.

Here is additional evidence of how no opportunity was overlooked. A newspaper man called the advertising department of the company and said: "You certainly have more confidence in the public than I have. I don't think it will respond to your appeal. You might as well save your money."

The next day the following advertisement appeared in all the papers:

> ***One of Our Friends***
> ***Said to Us Yesterday:***
>
> "You certainly have more confidence in the people than I have."
>
> Confidence in the people—in the people who ride our cars!
>
> Certainly we have confidence in them, and why not?
>
> We have found the men and women who ride our cars disposed to give us a square deal. They are the *kind of people who believe in dealing fairly by everybody.*
>
> They do not want something for nothing!
>
> Faith in them? Every day in the week we will pin our faith to them.
>
> Believe they will answer our appeal and in fairness drop 6 cents into the fare box?
>
> Certainly we believe they will!
>
> We have confidence in the car riders—and we firmly believe the car riders are going to assist us in maintaining the service we are supplying—a service far in excess of the old franchise requirements.
>
> Thank you!

Still another piece of effective advertising was the following placard used in the cars:

> ***Do You Know?***
>
> 154 cities have a 10-cent fare;
> 4 cities have a 9-cent fare;
> 109 cities have an 8-cent fare;
> 186 cities have a 7-cent fare;
> 99 cities have a 6-cent fare;
>
> In only *two* cities have fares been increased by court order.
>
> Car riders of Akron are *voluntarily paying 6 cents.*
>
> The *actual cost* of the car ride is 5.7 cents!

In the advertising there has been no let-up in the campaign from the day it was inaugurated and there will not be. As stated, the old franchise expires on Feb. 1, 1924, and the company believes that by that time the people will have become so thoroughly conversant with the situation that there will be no objection from those who ride the cars to paying the cost of their ride.

Is the campaign proving a success? Here is the answer:

Sunday, Aug. 19, the first day, nearly 10,000 pennies fell into the fare box. On Monday, the next day, the number increased to 19,000. It fell to 17,000 on Tuesday; went to 22,000 on Wednesday; decreased Thursday and Friday, and exceeded the 22,000 mark on Saturday.

Since the first week between 19,000 and 20,000 pennies—the number increasing somewhat day by day—have been placed in the fare box daily.

The average number of passengers carried slightly exceeds 100,000 in the city, so that nearly 20 per cent of the riders appear to be paying the 6-cent fare.

Now that the tickets have been placed on sale there is reason to believe that the percentage of those paying the 6-cent fare will be still further increased.

Observations in Three Tennessee Cities

Accident Prevention, Systematizing of Insurance Policies, Pull-In Records and the Railroad and Public Utilities Commission Were of Special Interest

BY "SPECTATOR"

CHATTANOOGA, Nashville and Knoxville, Tenn., are cities in which railway conditions are similar in many ways. The railways in these cities, as well as the other industries, are supplied with power by the Tennessee Electric Power Company, a virile, composite organization, made up of several railway and power companies now thoroughly merged. The railways in these three cities are fortunate in being affiliated with the prosperous power business.

One element of uncertainty which I found among the railways in Tennessee is the future status of the Public Utilities Commission, which is under vigorous political fire. The commission is elective and hence is necessarily "in politics." As far as can be learned, it is endeavoring to give the utilities a square deal, but it occupies a difficult position. The Governor appears to favor a commission of a different character, with commissioners appointed, but with provision for changing only a portion of the commission in any one year. It appears to me that the principle of regulation by commission is on trial in Tennessee and the outcome of the present agitation will be of general interest throughout the country.

In Chattanooga the intimate relation of the railway and power departments of the company is illustrated by the large use made of display spaces on the cars for the advertising of power service. Legends for this purpose are mounted in the car windows, so that from the street side they read continuously from end to end of the car. On its inside space each card bears a separate legend.

The shops at Chattanooga are particularly commendable, being roomy and cheerful and bountifully supplied with labor-saving devices. Traveling air hoists are particularly in evidence.

Since the formation of the Tennessee Electric Power Company was brought about the company has been making a comprehensive study of fire insurance, which is now on a systematic basis, one blanket policy participated in by several insurance companies covering the whole property. This is the subject of a special article on another page of this issue.

SIGNAL MOUNTAIN AND ITS RAILWAY

In Chattanooga there is an interesting mountain railway serving a thriving group of industries centering in Signal Mountain, namely, the Chattanooga Traction Company. Just ten years ago two land companies were formed to develop the territory adjacent to the city below and on Signal Mountain, 12,000 acres in all. Coal mines were opened up, an attractive hotel and cottages were built on the mountain, 1,500 ft. above the city, and manufacturing industries were encouraged to locate on the tract. The railway, of course, formed an essential feature of this development, as it was to supply all the local transportation. The railway was built according to the best practice, and its construction involved unusual difficult operating conditions of grade and curvature. A maximum grade of 5⅝ per cent was encountered, and the curvature in places seems almost too great for operation. These curves are, however, "negotiated" safely and without excessive wear on the equipment. There are three "horseshoe curves" on the mountain side. Of course it takes power to operate this line, each 26-ton car being equipped with four 70-hp. motors, geared to 33-in. wheels with a ratio of 20:66. The power comes from the Tennessee Electric Power Company, with which it has no financial connection, but whose tracks are also used for entrance to the city.

The passenger cars on Signal Mountain seat sixty-two passengers and the combination cars fifty, there being a roomy baggage compartment in each of the latter. Hourly service is given, and the fare for the 12 miles up the mountain is 25 cents. To Red Bank, 8 miles, the fare is only 10 cents, and that to Glendale, in the first zone, is but 5 cents for 6 miles. For the service given these fares are very low, but the company does a large freight business, which is much more profitable. In this service two electric locomotives are employed, and more than 500 carloads per month are handled. When enormous cement works now under construction are completed the freight business will be greatly increased.

SAFETY CAMPAIGN ACTIVE IN NASHVILLE

The Nashville Railway & Light Company, also a subsidiary of the Tennessee Electric Power Company, has been under fire, to show why the local carfare should not be reduced from 7 cents. Considerable stress was laid by the complainant on the fact that the company pays to one of the nationally known management and engineering companies certain fees for advice and engineering design and supervision. The company clearly brought out by expert opinion that it obtains full value for these fees and that a 7-cent fare is no bonanza in Nashville.

The Nashville Railway & Light Company is taking a leading part in the campaign recently organized to bring about accident reduction. J. P. W. Brown, general superintendent of the company, heads a newly formed local Safety Council. Headquarters of the council have been established in the Chamber of Commerce Building, with a former employee of the company in charge. Data which the council has promised for early publication in this paper will show remarkable results from these efforts.

There is a fine spirit on this property in the welfare work for employees and their families. The quarters of the Employees' Mutual Benefit Association and its program are like those of an enterprising club. The vocational educational plans of the company are also well advanced. As was illustrated in a recent article in this paper, the reclamation work going on in the shops is highly profitable. This work is supplemented by care in the purchase of supplies, as is illustrated in the case of lumber, of which a large quantity is kept in storage. Lumber is purchased in lots at advantageous times and stored under cover. The lumber storage contains a wealth of valuable wood, some specimens of which have been seasoning under natural conditions for several years.

FINE PULL-IN RECORD AT KNOXVILLE

In Knoxville I found the railway officials highly gratified with their pull-in record for the preceding month (May), which was 17,963 miles per pull-in. This record can be understood in view of the company's excellent shop facilities. The machine shop, in particular, is one of the best that I have seen recently. The mechanical department has adopted a motto: "Careful fitting is the secret of success." It seems to work out well here with regard to maintenance.

Knoxville is the center of vigorous bus activity. Thirty-seven bus lines terminate in the city, at several centers. An association of bus owners has been formed, and there is talk of a union bus terminal. This traffic appears to be largely of non-competitive character with the railway.

The Knoxville company is increasing its demand upon the power company and is installing 10,000 kva. in transformers to supply additional power which is to be purchased. The transformers will step the voltage down from 120,000 to 2,300 for the railway and to 13,200 for large power customers. The power company is putting in a duplicate transmission line to care for this rapidly increasing business.

Knoxville is one of the cities which has found ballasted track construction to be the most permanent for the local conditions. This permanence is only secured, however, by careful tamping and draining. The ballast is compacted by as many as four tampings under traffic. The railway is co-operating with the city in regard to paving, so as to prevent breakage where the municipal and utility pavings join.

Municipal Operation of Tramways Predominates in Great Britain

INTERESTING statistics of British tramways have been issued by the Ministry of Transport. The data, which cover both tramways and light railways on public roads, show the following for the fiscal year ended Dec. 31, 1921, for companies and March 31, 1922, for local authorities. Total route-mileage in operation 2,579 (4,275 track-miles), of which 1,756 miles was operated by local authorities and 823 miles by companies. The total gross receipts for 1921-22 were £32,523,339 and the total operating expenses were £26,835,292, leaving net receipts of £5,688,047, roughly an improvement of 30 per cent over the preceding year.

Passengers carried numbered slightly over four and a quarter billions, a decrease of nearly 9 per cent from the preceding year, while the car-mileage decreased slightly under 4 per cent. The operating ratio fell to 82½ per cent from 86.44 per cent, as it was during the preceding year, as compared with 64½ per cent in 1913 and 1914.

Of the 250 tramways in Great Britain 170 are owned by local authorities and eighty by companies. Of five track gages in use, ranging from 3 ft. 6 in. to 4 ft. 8½ in., 60 per cent of the track is of the last-named gage. More than 23 per cent is of the 3-ft. 6-in. gage. The average energy consumption during the year was 1.82 kw.-hr. per car-mile.

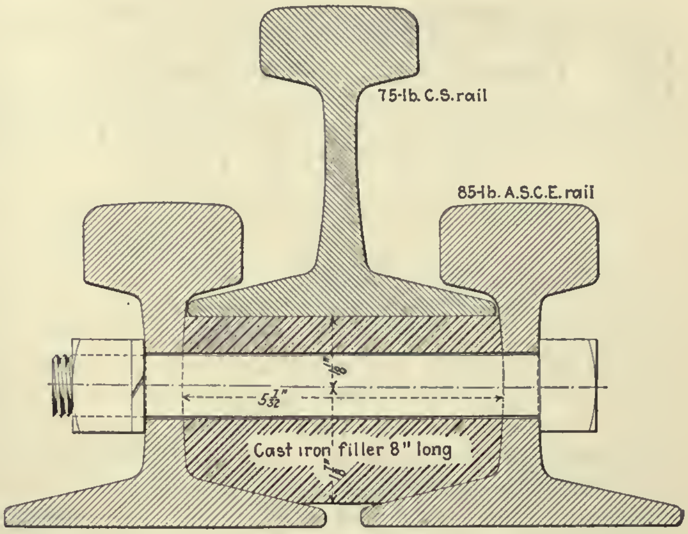
Combination Road and Drainage Ditch Crossing

Unique Construction on Interurban Line of Pacific Electric Railway Made Necessary by Locating of Drainage Ditch Across Right-of-Way

By CLIFFORD A. ELLIOTT
Cost Engineer, Engineering Department, Pacific Electric Railway, Los Angeles, Cal.

THE Los Angeles County Flood Control District is carrying out plans for handling the large volume of storm waters that collect each rainy season in southern California in a locality north of the Pacific Electric Railway's Del Rey-Redondo Beach interurban line near Rentchler station. In order adequately to drain this particular district, the county has constructed a concrete drainage ditch 40 ft. wide. The height of the retaining walls is 4 ft. from the base of the ditch to the top of the wall, which is 6 in. thick.

The drainage ditch follows the route of a highway and it was, therefore, constructed so that the floor of the ditch, which is suitably crowned, could also serve as a roadway, being built of concrete similar to a highway.



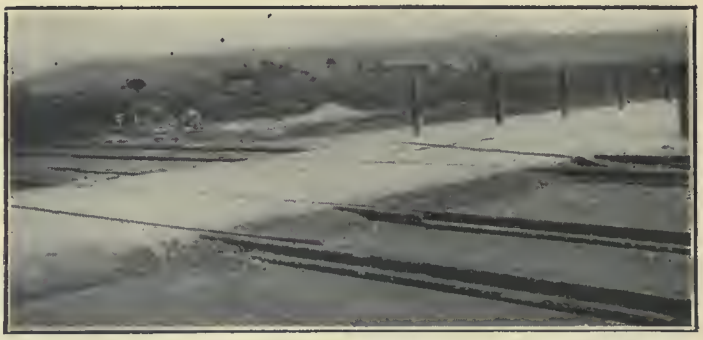
Details of Method of Supporting Rail Over Culverts

At the point of intersection with the interurban railway's tracks the ditch was spread to a width of 60 ft., running back 150 ft. at this width in each direction from the center line of the railway tracks. The highway was raised to the track level with a runoff of 250 ft. on one side and 350 ft. on the other. Wooden post barriers were placed along each side of the 20-ft. roadway on the raised section, and valley gutters, 4 ft. wide from the toe of the crowned highway to the face of the retaining wall, were provided. For the passage of the flood waters the railway installed under its double-track line two reinforced-concrete culverts which act as a water course for a section of the drainage ditch. One is located on each side of the 20-ft. concrete elevated highway.

These culverts are of the compartment type. The width of the opening in each is 6 ft. and its height is 3 ft. 3 in. The section of the railway right-of-way occupied by the culverts and not paved in was planked over, but where the 20-ft. highway crosses the railway tracks 6-in. concrete pavement was laid.

The tracks over the concrete culverts are of T-rail girder construction, two 85-lb. rails set longitudinally, forming with the rail a girder support for each rail of the tracks. This rests on inverted pieces of T-rail set in the concrete. Details of this plan for supporting the track rail over the 6-ft. opening are shown in one of the accompanying illustrations.

Where the concrete paving crosses the tracks, a 20-ft. length of 75-lb. C. S. revised section guard rail was mounted inside of each track rail, providing a flangeway in which the car wheel flanges can run without damage to the roadway.



At Top, Crossing of Pacific Electric Tracks with Combined Drainage Ditch and Highway Furnishes Interesting Construction Problem. At Left, Crossing of Tracks and Highway at Grade. At Right, Guard Rail Edges Concrete Paving and Provides Flangeway at Crossing.

The Readers' Forum

Factors in Rail Head Wear

THIRD AVENUE RAILWAY

NEW YORK, N. Y., Sept. 4, 1923.

To the Editors:

The article by Charles H. Clark in your issue of July 14, entitled, "Wear on Rail Head May Determine Life of Track," includes an interesting tabulation showing rail wear and corresponding car traffic at various locations in Cleveland. Mr. Clark's article gives the impression that in Cleveland, owing to the use of the "best modern construction," "the life of the track is practically the life of the head of the rail and the construction combined" instead of being controlled by "the life of the joints," which has been pretty generally the experience in other cities. Elsewhere in the article, the best modern construction is indicated to be, at the present time, "the solid concrete steel tie construction."

A summary of the tabulation given, obtained by adding up the items for the two classes of construction shown, is as follows:

Years in Service	Number Cars in Millions	Type of Ballast	Vertical Rail Wear in Inches per Million Cars At Stop	Between Stops	Average	Wear per Year
209	67.2	Crushed stone	0.088	0.066	0.077	0.025
466	156.3	Concrete	0.099	0.059	0.079	0.026
675	223.5	Total	0.095	0.061	0.078	0.026

The rail wear as shown by this summary is substantially the same with concrete and with crushed stone construction. With the exception of the first item, which is track that has been in service eighteen years, none of the rail given in the tabulation has worn more than ⅜ in. vertically. As this includes only part of the Cleveland tracks, it is impossible to tell from it what the average wear on Cleveland rail has been at the time of its renewal.

The sketch given on page 47 of worn rail section 95-400 indicates wear of about 13/16 in. if measured on the edge of the head next to the gage line fillet. In referring to it Mr. Clark comments that it was removed on account of cracking of the web below the head. He gives a movement of 21,000,000 wheels over this rail. Assuming these to be under double-truck cars similar to those at present in use in Cleveland would give a movement of 5,250,000 cars, which, at the average rate of wear in the table, would give a total vertical wear of 0.41, or 13/32 in., which is about half the amount of wear shown on the sketch. This figure of 13/32 in. also agrees fairly well with the figures given in the paragraph at the bottom of the first column on the first page of the article.

In actual practice rails are often removed for reasons not by any means controlled by the amount of wear on the rails. Pavement renewals and political considerations all tend to make the life of the rails much shorter than the maximum which could be obtained if the joints permitted the rail to be worn down to a minimum thickness between joints, and if nothing else interfered arbitrarily to shorten the life of the track.

The article contains a diagram showing the average cars per mile per year. The variations above and below the mean since 1914 are practically equal in amount, averaging 126,000 cars per mile per year. A second diagram shows the average age of track removed each year. In 1916 this was only about 11¾ years, which was extraordinarily low for an average figure, and probably much below the average of the country generally, showing that track renewals in Cleveland had been made on an exceedingly liberal basis. This seems readily to account for the increased average life of track removed since that date, the present average of about 17¼ years being considerably nearer the normal of other companies. It is also to be noted that this increase in age coincides with the war period from 1916 to 1919.

In the last paragraph of Mr. Clark's article he refers to tilting the rails at an angle of 1:25, which, he concludes, "means at least 15 per cent more life." It should be noted that the redesigned Cleveland rail referred to in the next sentence is not intended to be used tilted, and the additional life which may be expected of it is due to the fact that the head of the rail is a quarter of an inch thicker than in the old section, making the total height of the rail 7¼ in.

The main conclusions the writer wishes to draw are, first, that there is nothing in the figures given to show any superiority of solid concrete construction over construction using crushed stone ballast; and second, that the increased average life of track removed dating from the beginning of war-time conditions in 1916 seems to be due to other causes than the rate of rail wear.

E. M. T. RYDER, Way Engineer.

Reproduction Method of Valuation More Convenient to Apply

NEW YORK, Aug. 28, 1923.

To the Editors:

I was much interested in your comment last week on the reproduction and investment methods of valuation from the standpoints of public relations and the reward of good judgment. Fortunately, it is not necessary longer to discuss which method is the more just to utility and public. That is up to the courts and commissions, and they are settling it rapidly.

There is a phase of the subject, however, to which attention might also well be directed, and that is the relative convenience in application of the two methods. In this, the reproduction method is far superior to the investment method for any properties except the very modern ones. With cost of reproduction as a basis, the facts are always available if one seeks them, but the investment method means dependence on historical records, which, if they exist at all, are nearly always apt to be incomplete. And incompleteness in this case practically means that many important items of expense must be omitted because they are unknown or cannot be proved. Some knowledge of the historical conditions surrounding the installation must be available, even with the reproduction method, but nowhere nearly as much as with the investment method. In consequence, reproduction valuations of several properties recently show practically no difference in the inventories, as determined by the engineers of the opposing sides. Such is more apt to be the case, of course, when the inventories are made at the same time and the engineers can compare notes. The differences that exist in the valuations usually occur in the intangible items to be included and the price data.

ENGINEER.

Association News & Discussions

Pacific Claim Agents Hold Successful Meeting

THE most successful convention ever held, was the general verdict after the meeting of the Pacific Claim Agents' Association at Portland, Aug. 22 to 24. The good results obtained in that city along safety education and accident prevention lines were of particular interest to the claim agents. It was the opinion that this had been brought about principally through the hearty co-operation between municipal officials and the railway.

Safety and Its Relation to the Public

In a paper read by B. F. Boynton, Portland Railway Light & Power Company, the problem of interesting the public along safety lines was discussed. "You must first thoroughly demonstrate that you are sincere," said Mr. Boynton, "that you understand what you are doing, and that you are perfectly willing to work hard, not for private gain, but for the general welfare. Beneficial results can be obtained by talking to school children about accident prevention. The organization of safety officers at each school, who report to their principals any infraction of traffic regulations, has been found a helpful scheme. Whenever an accident occurs, and one of these safety officers is near, he immediately gets all the data possible and turns them over to the chief of safety officers.

"One of the best ways to get the confidence of the people is for the claim agent who is a good mixer to affiliate with all the different civic bodies in the city, attend the meetings regularly, be willing to work hard along any helpful lines of civic work, to show himself willing at all times to help the other fellow when he needs assistance. The latter will then be more ready to come to your aid when you need him."

Discouraging Litigation in Damage Claims

J. H. Handlon, Market Street Railway, San Francisco, spoke on methods by which litigation can be discouraged. "What can we do toward prevailing upon claimants to abandon all thoughts of litigation?" said Mr. Handlon. "We must by our conduct, by our own behavior, instill confidence so that the 'other fellow' has faith in us. We must establish, if possible, in the minds of claimants, the thought that we are striving to deal justly by them. Let us endeavor to convince them that we are trying to obtain a proper perspective of the merits of their claims. We must try to eradicate any impression which they may have that we are advocates paid solely to champion the interests of the company.

"We must give claimants to understand that the lawyer representing the company is hired to plead, support, vindicate and defend the company, therefore the lawyer is right in assuming a fighting attitude when combating litigation; but as claim agents we aim to be just as impartial as a judge or jury weighing the merits of the case.

"The publicity given to the methods employed by the company in striving to prevent accidents is a factor establishing a friendly feeling toward the company. Claimants then are more disposed to look kindly upon offers of settlement, for they are not so vindictive and not so likely to ask punitive damages.

"The good will of lawyers and doctors should be cultivated. Lawyers are encouraged to deal directly with the claim agent. A lawyer ordinarily wants to facilitate the handling of the claim without burdening himself with too much effort. We should pave the way to a final disposition of the claim by putting him to as little inconvenience as possible. We are always trying to develop the good will of physicians in numerous ways, particularly by making an effort to protect their bills and by allowing them liberal fees.

"The general public's letters are acknowledged in prompt, respectful and business-like fashion. Persons are treated courteously on their arrival at the office. Our reception room is supplied with newspapers and magazines for their convenience. Our walls are covered with accident prevention placards and similar exhibits, planned to interest them if they are compelled to wait before being interviewed. Telephones and drinking water are at their service. They are not only pleasantly greeted but given to understand that we do not look upon them with suspicion; that it is our wish to pay what we owe and we do not have any intention of evading our just obligations; that we merely ask their co-operation in gathering the facts; that everybody, whether rich or poor, influential or forsaken, is treated alike."

Liability of the Auto Driver to His Guests

In a paper A. L. Levinsky, Stockton Electric Railway, said that at the San Diego convention, after a discussion upon this subject, it was suggested that action should be taken at the next session of the Legislature to have the statutes upon negligence amended so that railways might escape the burden cast upon them by the decisions on the liability of the automobile driver to his guests. He therefore wrote to the law departments of various transportation companies, and two bills were finally agreed upon, which were presented to the Legislature, but unfortunately did not obtain favorable action. After giving the proposed amendment very careful consideration, it was felt that it was an intricate matter to prepare an amendment which would be constitutional.

Mr. Levinsky stated that in line with recent decisions, it has been held that if the driver and guest were engaged in a joint enterprise, then the negligence of the driver could be imputed to the guest.

But in order that there be such a joint undertaking it is not sufficient, according to court decisions, that the passenger or occupant of the machine indicate to the driver or chauffeur the route he may wish to travel, or the places to which he wishes to go, even though in this respect there exists between them a common enterprise of riding together. The circumstances must be such as show that the occupant and the driver together had such control and direction over the automobile as to be practically in the joint or common possession of it.

Education of Employees

H. G. Winsor, Tacoma Railway & Power Company, in a paper on education of employees, said that some companies have attempted education in various ways, but the results have been in most cases unsatisfactory, principally because the objective has been clouded, or the means of accomplishment lacking. "As claims men," continued Mr. Winsor, "we have for a number of years persistently followed a plan to educate our employees in accident prevention. The results have been beneficial from the humanitarian and financial view points.

"I have been very much interested in a report by Mr. Handlon which contains the record of proceedings of a research committee appointed in November, 1920, by President Von Phul of the Market Street Railway and working in co-operation with the Pacific Coast Bureau of Employment Research. The principal application to education of the work reported by this committee is found in the mental tests in which employees, principally motormen, were examined in various ways to determine their mental ability properly to perform their duties. The results agreed with those secured in other industries and in the United States Army. Many men were found to have the mentality of a person ten to fifteen years of age. This condition, which is reported to exist in all industrial groups, emphasizes the need of education.

"As claims men we have only a limited opportunity in the education of employees. Such work of this nature as we have undertaken in the past has, we believe, proved successful. Our experience must, therefore, be of some value in any development which our employees may undertake."

OFFICERS ELECTED

The officers elected for the following year are: President, P. O. Solon, San Francisco-Oakland Terminal Railway; first vice-president, S. A. Bishop, Pacific Electric Railway; second vice-president, V. F. Bennett, San Diego Electric Railway; third vice-president, C. R. Peck, Portland Railway, Light & Power Company, and secretary-treasurer, B. F. Boynton, Portland Railway, Light & Power Company. The new executive committee will consist of J. H. Handlon, chairman; T. G. Aston, H. G. Winsor, W. H. Moore, C. A. Blackburn, F. E. Oakley, H. K. Relf, A. M. Lee, A. L. Levinsky, and C. N. McRoberts.

Track Building with Steel Ties*

By CLYDE L. HEDGES
Wisconsin Railway, Light & Power Company, La Crosse, Wis.

OUR track program this year for city track construction in La Crosse calls for the relaying of 2.7 miles of track, all in paving. Of this track 1.2 miles is in bituminous concrete paving, and the balance in brick. All was laid with 6-in. 72-lb. T-rail except 0.1 mile, which we laid with 70-lb A.S.C.E. section, in bituminous concrete paving.

For foundation to be placed under wood tie construction 5 in. of No. 1 and No. 2 limestone is used. It is rolled with a 10-ton roller, sufficient No. 3 crushed limestone being used for tamping before rolling, thus making a total of 6 in. of rock under the ties. Dayton mechanical ties will be used for 0.8 mile and on the balance 7-ft. cedar ties. Concrete to the depth of 5 in. is placed between the ties and under the rail in wood tie construction, for support of paving. Standard spikes 5½ in. x $\frac{9}{16}$ in. are used. Experience has shown tie rods are not necessary.

For joint welding we use an Indianapolis welder. All of our track this year will be welded with Apex joints, which are preferred to the Simplex joint on account of the better head support. Four pounds of Grade "B" and 1 lb. of Grade "C" welding material are used on each joint. Our joints cost about $6.55 each, divided as follows:

Labor	$0.75
Current	.60
Welding material	.50
Welding plates	4.70
Total	$6.55

Under the ball of the rail and adjoining the web, cement mortar is placed, against which the outer paving block is laid. Along the gage side of the rail a special mold block of Nelsonville pattern is placed of size to fit the rail. A special Nelsonville stretcher brick is laid inside of the rail. Three rows of regular paving block are placed lengthwise adjoining the outside of the rail.

We have purchased new double curves wherever necessary, arranged for car clearance. Wherever we have replaced any switches, iron-bound manganese hard center construction is used. All our switch points are arranged with reversible automatic spring switch boxes.

Our plan for the installation of the Dayton resilient tie is as follows: We establish a grade for street paving, and roll with a 10-ton roller. Then the track is located and under each rail a trench is excavated 15 in. wide and of sufficient depth to allow 6 in. of concrete between the bottom of trench and bottom of ties after the rail has been brought to grade. We then place wood ties across the trench about every 20 or 30 ft., the distance being governed by the weight and flexibility of the rail installed. The rails are set in position on the ties above the trench grade. We then hang the ties to the rail by means of the fasteners which are provided with them. At first only every fourth or fifth tie is hung in order that the track gage may be verified at points where these ties are installed. The intermediate ties may then be hung and fastened permanently. In spacing the ties 3-ft. centers are allowed, and the space is closed to 2-ft. centers next to the joint tie. After all ties are properly spaced and fastened, track is lowered on 12-in. blocks spaced every 20 ft. in the trench. Old ties may be used for blocks. The track is ready for final line and grade after it is lowered on the blocks. Wood shims are used between wood blocks and rail wherever necessary. In tightening the tie fasteners, a short wrench not more than 10 or 12 in. long should be used, and care should be taken not to screw the nut tighter than is necessary to seat the rail firmly upon the tie block. The Dayton tie has a cushion of asphalt ½ in. thick under each of the wood blocks, and if the nuts are run down too far the asphalt will squeeze out between the two blocks.

The following concrete mix is used: One part portland cement, three parts sand, six parts coarse aggregate. If pit run gravel is used it should be free from soil, and the mix used is one part cement to six parts gravel. In pouring the concrete a man should be present constantly with tamping bat to see that no voids are left under or about the tie blocks.

In welding the joints it is good practice to weld the base of the rail to the top plate of the joint tie.

A rail grinder supplements the work of the track welder. With the welder and grinder we have been able to save a great deal of special trackwork such as frogs, switches, mates and crossings. The worn-out frog or switch is built up by depositing new metal, which is then ground down without disturbing paving or traffic. Cupped joints and deep depressions are filled in and then ground to the original surface.

It is our intention to go over all joints on our new work and grind off any slight high spots the rail may have, and we will then have a perfect joint. Our welder has been used to fill bolt-holes in car trucks which have become oblong through wear. These holes have been filled in solid with new metal and then rebored. This is much more satisfactory than the old method of plugging and redrilling. We have been able to weld many new ears on gear cases.

On one of our streets a number of years ago the operators of the property at that time installed 70-lb. A.S.C.E. rail in brick pavement. To bring the rail to proper height for 4-in. paving brick the 70-lb. rail was laid on wood shims on wood ties. The shims have since rotted out and the track has become depressed in the pavement. We have found it necessary to relay the 70-lb. rail with 72-lb. 6-in. T and repave between the rails. We have been able to save most of the brick for repaving by laying them with the worn side down and asphalting in. For the above reason we are laying all new track with 6-in. rail.

International Conference on Standardization

A CONFERENCE of the secretaries of national industrial standardizing bodies was held in Zurich and Baden, Switzerland, July 3 to 7. Thirteen countries were represented, including all of the more important industrial nations of Europe and America. The United States was represented by P. G. Agnew of the American Engineering Standards Committee.

A leading topic discussed by the conference was the interchange of information between the various national bodies during the development of the work in the different countries. While it was not possible to overcome all the difficulties existing, substantial progress was made. It is believed that the steps taken will lead immediately to a substantially increased amount of interchange of information during the earlier stages of standardization work, and that the way has been paved for a much more extensive interchange in the future.

Provision was made for continuing the work of the conference on the many administrative problems of common interest, through a loosely-knit continuing organization. An example of such work planned by the conference is the translation of technical terms of special importance or difficulty in standardization work. There will gradually be built up such a vocabulary of technical terms, mainly in English, French and German, but supplemented as far as may be feasible and necessary by the corresponding terms in other languages. Another example is the work undertaken by the conference on the classification and nomenclature of standards.

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*Abstract of a paper presented before the Electric Railway Section of the Wisconsin Utilities Association, Oshkosh, Wis., Aug. 17, 1923.

Birmingham's Experiment with Trackless Trolley*

AT THE annual conference of Municipal Tramway Association, Portsmouth, England, Aug. 22-24, Alfred Baker, general manager Birmingham Corporation Tramways, presented a paper giving an interesting account of the reasons why the City Council determined to try trackless trolley cars and of the satisfactory traffic and financial results so far obtained on a route which was formerly occupied by a tramway.

Mr. Baker, in opening, said that the opponents of tramways had been delighted when it was announced some time ago that Birmingham had decided to abandon one of its tramway routes and to substitute some other system of traction. But the fact was that there was no system of traction that could cope with rush-hour traffic with the same ease and facility as the tramway. Tramways were as alive today as they ever had been and would hold the field for many years in dealing with large volumes of traffic.

In 1921 Birmingham Corporation was faced with the reconstruction of a very large amount of permanent way, a matter at that time of grave concern owing to the high cost of wages and material. At prices then obtaining, it was only on routes of enormous traffic that reconstruction could be faced without anxiety. The corporation was then reconstructing certain heavy traffic routes.

On the other hand, he said, there were certain other routes requiring reconstruction where the traffic was comparatively light. The Nechells route was one of the latter. It was only single track and ran through narrow streets. The alternatives to reconstruction were the petrol omnibus and the trolley omnibus. The former the corporation knew all about, having a large fleet already in operation, so it directed its inquiries to the subject of the trackless car system. After exhaustive inquiries it was decided to adopt the trolley bus as being the most suitable for this route.

In considering relative merits, the question of carrying capacity was very important. The tramcars running over the route were double-deck top covered vehicles seating fifty-four passengers each. It seemed to the corporation that any new vehicle adopted must be able to seat passengers approximating in number those carried on the tramcar. This seemed to point to the double-deck petrol bus, as the majority of the trolley buses running in England were single-deck vehicles carrying only from twenty to thirty passengers. It was known, however, that R. H. Wilkinson of Bradford was experimenting with a double-deck trolley vehicle carrying about fifty passengers, and this was investigated.

OPERATING COSTS

The most important question was that of operating costs. The cost of running double-deck trolley vehicles of large seating capacity was unknown, as no vehicles of this type were in regular service in other towns. Such knowledge as they did possess, however, led the tramways committee to believe that operating costs would be less than petrol bus costs and that the working expenses would be similar to those of tramway operation. In coming to the decision to adopt the trolley bus, estimates were put forward to the effect that to reconstruct the tramway route would cost £90,000, while to install trolley buses would cost only £36,000. The gross total for the trolley system was £54,000, but £18,000 was deducted as the value of twelve tramcars transferred to other routes. The items of the £54,000 were: Twelve trolley buses, £36,000; alteration to overhead lines, £3,000; taking up tramways and making good the street for ordinary traffic, £15,000.

In regard to receipts, those of the tramway, based on previous years, were £28,300, while the expenses were £22,640, giving a gross profit of £5,660. If the amount required for reconstruction was made the subject of a loan, the interest and sinking fund charges would amount to £9,000, thus bringing out an annual loss of £3,340. For the trolley buses the receipts and expenses were put at the same figure as for the tramway, less a saving of 1.25d. per car-mile on permanent way repairs (£1,562). There was thus a gross profit of £7,222, and as interest and sinking fund charges would be only £4,100, there was a net profit of £3,122.

The trolley buses which were ordered provided seating accommodation for fifty-one passengers each—twenty-six in the lower saloon and twenty-five on the upper deck. The weight was 7 tons 6 cwt. (16,352 lb.) empty. After the tramway was pulled up and the road surface restored, the trackless cars began running on Nov. 27, 1922.

COMFORTABLE RIDING

The new system immediately took with the public. The trolley bus gave the passengers a most comfortable ride with an entire absence of jerks. They ran with extreme smoothness and were practically noiseless. There was no vehicle in transport service that for ease and comfort could compare with a properly constructed trolley bus. The route, which it had been thought had reached the limit of its capacity, immediately began to improve its returns. The trolley buses attracted more passengers than had ever ridden on the tramcars. The mileage run had been increased without increasing the number of cars in service.

Tables submitted showed increases of passengers per week, compared with the tramcars, ranging up to about 50 per cent. Receipts were also up, but per car-mile they were down, owing to the increased mileage run. Accounts drawn up for the period from Nov. 27, 1922, to March 31, 1923, showed that the traffic receipts of the trolley buses were £8,812, or 19.234d. per mile run. The total working expenses (excluding income tax and capital charges) were £5,789, or 12.648d. per mile run. The costs per car-mile under the various main headings were: Power, 2.131d.; traffic, 6.843d.; general, 2.351d.; repairs and maintenance, 1.209d.; contributions for health insurance and national insurance, 0.114d.

The figure of 12.648d. per car-mile compared with 15.407d. for petrol buses and 14.824d. for tramcars in Birmingham. While it was true that the full burden of repairs for the trolley buses had not yet been reached, still figures confirmed the view that operating costs of trolley buses need not exceed the costs of tramcar operation.

SPHERES FOR TROLLEY BUS AND PETROL BUS

Each system had its own sphere of usefulness, but for large volumes of traffic tramways held the field. If he was asked as to how he would employ petrol buses and trolley buses in conjunction with tramways, he would be inclined to suggest—though in every case local conditions would have to be the deciding factors—as follows:

1. In anticipation of an extension of an existing tramway, where it was reasonably probable that tramways would be required at some future date, he would use the trolley bus.
2. He would use the trolley bus in substitution for a single line of tramway where the traffic was light, or where it was not possible to double the track.
3. On routes in suburban districts where some sort of transport was necessary and where there was no likelihood of tramways being required, he would certainly use the petrol bus.
4. He would use the petrol bus in running cross-country routes and in connecting up the outer termini of tramways. Petrol buses could be made to serve a most useful purpose in linking together the country ends of the tramways.

Wrought Iron Bars and Plates Standardized by A.E.S.C.

THE American Engineering Standards Committee has adopted as tentative American standards the specifications submitted by the American Society for Testing Materials, one covering staybolt iron, engine-bolt iron and extra-refined wrought-iron bars; second for refined wrought-iron bars, and a third for wrought-iron plates. The special committee in charge of these specifications was headed by E. C. Peck, representing the American Society of Mechanical Engineers. The committee further recommended that the American Society for Testing Materials should be designated sponsor, under A.E.S.C. procedure, for the future development and revision of these specifications.

C.E.T.A. September Meeting Announced

THE next regular meeting of the Central Electric Traffic Association will be held at Yellow Banks Hotel, Webster Lake, Ind., on Friday and Saturday, Sept. 14 and 15.

The morning session of Friday will be called to order at 9 o'clock and will be in the nature of a round-table discussion. All matters of importance should be brought before the association at this time.

The afternoon session will be in charge of J. S. Bleecker, general manager Indiana, Columbus & Eastern Traction Company. Mr. Bleecker is chairman of the committee on publicity of the Central Electric Railway Association and is taking this opportunity of bringing before the traffic representatives the value of publicity on the part of electric railways. Mr. Bleecker has arranged to have present representatives of the various committees on public utility information in the association territory.

American Association News

Transportation Plans for the Atlantic City Convention

ALL of the trunk line passenger associations of the country have authorized the sale of round-trip tickets to the convention in Atlantic City at the rate of one and one-half the single way fare. This will be done on presentation of a special certificate on purchase of ticket at the local ticket office. Certificates are being mailed to members by Executive Secretary J. W. Welsh.

One certificate is good for any member of the association, including dependent members of his family. Tickets may be purchased for the going trip beginning Oct. 4 to 10 inclusive, and the return trip may be made leaving Atlantic City up to Oct. 18, but must be by the same route as the going trip. Tickets will be validated at Atlantic City, N. J., by agents at the regular ticket offices.

Detailed arrangements have been placed in the hands of a special committee on transportation, one company member and one manufacturer member in general having been designated for each state.

The complete personnel of the committee follows:

H. J. Kenfield, chairman and representative for Illinois, *Electric Traction*, 431 South Dearborn Street, Chicago.

RAILWAY MEMBERS

Alabama, F. V. Underwood, Birmingham Railway, Light & Power Company; Arkansas, C. J. Griffith, Arkansas Central Power Company, Little Rock; California, W. V. Hill, California Electric Railway Association, San Francisco; Colorado, Ernest Stenger, Denver Tramway Company; Connecticut, J. K. Punderford, Connecticut Company, New Haven; Delaware, T. W. Wilson, Wilmington & Philadelphia Traction Company, Wilmington; District of Columbia, J. H. Hanna, Capital Traction Company, Washington; Florida, J. P. Ingle, Jacksonville Traction Company.

Georgia, F. L. Butler, Georgia Railway & Power Company, Atlanta: Indiana G. K. Jeffries, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis; Iowa, C. D. Cass, Waterloo, Cedar Falls & Northern Railway, Waterloo; Kansas, George Theis, Jr., Arkansas Valley Interurban Railway Wichita; Kentucky, Samuel Riddle, Louisville Railway; Louisiana, H. B. Flowers, New Orleans Public Service, Inc.; Maine, Alfred Sweeney, Androscoggin & Kennebec Railway, Lewiston; Maryland, L. H. Palmer, United Railways & Electric Company, Baltimore.

Massachusetts, Edward Dana, Boston Elevated Railway; Michigan, E. J. Burdick, Detroit United Lines; Minnesota, Vincento Law, Twin City Rapid Transit Company, Minneapolis; Mississippi, W. R. Phipps, Meridian Light & Railway; Missouri, B. W. Frauenthal, United Railways Company of St. Louis; Montana, E. J. Nash, Butte Electric Railway; Nebraska, R. A. Leussler, Omaha & Council Bluffs Street Railway, Omaha; New Hampshire, E. C. Foster, Manchester Street Railway.

New Jersey, H. C. Donecker, Public Service Railway, Newark; New York City, George Keegan, Interborough Rapid Transit Company; New York, W. H. Collins, Fonda, Johnstown & Gloversville Railway, Gloversville; North and South Carolina, Raymond Hust, Tidewater Power Company, Wilmington, N. C.; North Dakota, C. P. Brown, Northern States Power Company, Fargo; Ohio, J. H. Alexander, Cleveland Railway; Oklahoma, J. W. Shartel, Oklahoma Railway, Oklahoma City; Oregon, F. T. Griffith, the Portland Railway, Light & Power Company.

Pennsylvania, F. R. Phillips, Pittsburgh Railways; Rhode Island, R. R. Anderson, United Electric Railways, Providence; South Dakota, R. C. Mills, Sioux Falls Traction System; Tennessee, E. D. Reed, Tennessee Electric Power Company, Chattanooga; Texas, G. H. Clifford, Northern Texas Traction Company, Fort Worth; Utah, H. F. Dicke, Utah Light & Traction Company, Salt Lake City; Virginia, J. E. Harvell, Virginia Railway & Power Company, Richmond; Washington, R. A. Willson, Spokane United Railways; West Virginia, E. B. Moore, Monongahela West Penn Public Service Company, Fairmont: Wisconsin, S. B. Way, Milwaukee Electric Railway & Light Company.

MANUFACTURER MEMBERS

California, F. R. Fageol, Fageol Motors Company, Oakland; Connecticut, C. L. Hancock, Bridgeport Brass Company, Bridgeport; Georgia, P. M. Potter, Mutual Foundry & Machine Company, Atlanta: Kentucky, Carl P. Nachod, Nachod Signal Company, Louisville; Maine, N. E. Hodgkins, J. F. Hodgkins Company, Gardiner; Massachusetts, W. P. Underhill, L. C. Chase & Company, 89 Franklin Street, Boston; Michigan, M. J. Phelan, Peter Smith Heater Company, Detroit; Missouri, J. B. Spencer, Southern Wheel Company, St. Louis.

New Jersey, Joseph Kempf, Wilson Imperial Company, Newark; New York City, C. D. Eaton, American Car & Foundry Company; New York, E. P. Waller, General Electric Company, Schenectady; Ohio, W. P. Day, International Steel Tie Company, Cleveland; Pennsylvania, M. B. Lambert, Westinghouse Electric & Manufacturing Company, East Pittsburgh; Rhode Island, A. J. Thornley, Consolidated Car Fender Company, Providence; Wisconsin, J. R. Jeffrey, Allis-Chalmers Manufacturing Company, Milwaukee; Canada, W. W. Horwood, Canadian Steel Foundries, Ltd., Montreal, Que.

Experience with Buses

AT THE last American Association executive committee meeting, reported in last week's issue, some discussion came up about competition of buses. Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad, said that the electric railways ought to go into the bus business if for no other reason than to meet fire with fire. He said that the worst thing about competitive bus lines is their effect on the ability of the railway to sell securities. He considered that the best protection is for the railways to operate buses and thereby prevent others from getting into the territory. Furthermore, if there is any need for this character of transportation let the railways provide it.

Mr. Budd said that the Chicago, North Shore & Milwaukee Railroad now has nearly half a million dollars invested in buses, though practically none of this business is profitable. But the interests of the North Shore road have been protected as most of the routes out of Chicago to the north have been supplied with bus service.

To determine whether there was any demand for a bus service paralleling the North Shore line between Chicago and Milwaukee, Mr. Budd bought five Fageol buses and advertised that three trips a week each way would be made. The traffic department devoted nearly its entire time for three weeks to solicitation of business for this service and at the end of that time had succeeded in securing seven passengers, the general comment being, "Why should we ride buses when there is good railway service?" These buses are now being used in special tours to Delavan Lake, Wis., and other resorts. There has been a call for this service such that about three buses a day have been dispatched on special tours. Mr. Budd reiterated that he doubted whether his bus business would be profitable, but it would at least protect the railway from others getting in.

Engineering Executive Committee Meets

A MEETING of the executive committee of the Engineering Association was held in New York on Aug. 23. Plans for the October convention were taken up in considerable detail. On account of the large number of committee reports to be considered, and the limited time available for discussion, it was decided that each speaker would be limited to five minutes. The committee expects to get considerable written discussion, and in order to save time it is requested that an abstract be furnished with each contribution which will give the principal points.

The committee on revision of the engineering manual made a progress report. It was recommended that a permanent bound volume be published within a reasonable time after the convention. It was also recommended that the committee on standards be relieved from direct responsibility for the manual, and that the committee on manual should be made a standing committee composed of members of the executive committee, with authority to edit for publication the material submitted and prepare the makeup of the manual.

The program for the convention was next discussed. It was agreed that the subjects committee should not make a report after each session, but should prepare a complete report immediately following the convention. The various reports of the committees of the Engineering Association were discussed, and they were approved for publication upon recommendation of the sponsors for each committee.

H. A. Johnson was appointed a subcommittee to report on the policies of the heavy traction committee; E. H. Scofield to consider the work of the power generation committee; and C. R. Harte to decide on the question whether signals should be retained as a subject for the power distribution committee, or should be handled otherwise.

The secretary explained briefly the results of a conference called by Secretary of Commerce Hoover for the purpose of forming an advisory council consisting of representatives of the technical societies and trade associations in conforming specifications for governmental purchases of supplies.

A special committee was appointed to co-operate with the Bureau of Standards in work affecting electric railways, consisting of R. H. Dalgleish, C. S. Kimball and W. W. Wysor.

The activities of the American Engineering Standards Committee were reported on by Mr. Cram, who presented a memorandum on the relations of the Engineering Association to the A.E.S.C. The status of the work of the various sub-committees of the latter association, on which the Engineering Association is presented, was discussed. The entire proposal was submitted to a committee composed of Messrs. Cram, Harte and Hecker.

A committee on subjects to select suitable topics for next year's standing committees was appointed consisting of C. H. Clark, R. C. Cram, C. R. Harte, H. H. Norris and L. C. Datz.

It was reported that practically all the money has been contributed for the rail joint investigation. The committee is now awaiting bids from manufacturers to provide the equipment. Co-operation with the Central Electric Railway Association in its recent car braking tests was taken up, and it was decided to analyze and work up the results of these tests.

Requests for an alternate for the president of the Engineering Association at meetings of the executive committee of the American Association was taken up. President Datz announced that hereafter the alternates will be the vice-presidents of the Engineering Association in order of seniority.

Those present at the meeting were L. C. Datz, chairman; R. C. Cram, R. H Dalgliesh, D. Durie, C. R. Harte, C. H Clark, H. A. Johnson and G. C. Hecker, who acted as secretary.

New Members of A.E.R.A.

THE last meeting of the executive committee approved the applications for membership in the American Electric Railway Association of the following companies—two railways and nineteen manufacturers:

Lake Superior District Power Company, Ashland, Wis.

Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

Jerome Detective Service Company, San Francisco, Cal.

Portland Cement Association, Chicago, Ill.

Elliot Frog & Switch Company, East St. Louis, Ill.

Macbeth-Evans Glass Company, Pittsburgh, Pa.

Hoover Body Company, York, Pa. (bus and truck bodies).

Johns-Pratt Company, Hartford, Conn. (fuses and electrical protective devices).

Rubberset Company, Newark, N. J. (paint brushes).

W. S. Godwin Company, Inc., Baltimore, Md. (steel paving guards).

Southern Signal Company, Louisville, Ky. (track instruments and other railway signal appliances).

Federal Motor Truck Company, Detroit, Mich.

Graham Brothers, Detroit, Mich. (motor trucks).

Powers Accounting Machine Corporation, New York City.

N. A. Petry Company, Inc., Philadelphia, Pa. (automobile specialties).

Clark-Williams Engineering Company, Inc., Bridgeport, Conn. (pole supports).

Budd Wheel Company, Philadelphia, Pa.

National Malleable Castings Company, Cleveland, Ohio.

Wales Adding Machine Company, Wilkes-Barre, Pa.

New York Transportation Company, New York City (motor buses).

E. B. Badger & Sons Company, Boston, Mass. (Badger ball cushions).

Meeting of Purchasing Agents and Storekeepers

THE purchases and stores committee has been handicapped heretofore by the lack of a definite place at the convention, therefore the executives of the American and Engineering Associations have approved its request for a session at this year's convention to be devoted entirely to subjects of interest to purchasing agents and storekeepers. The program follows:

SESSION OF PURCHASING AGENTS AND STOREKEEPERS AT YOUNG'S MILLION DOLLAR PIER. ATLANTIC CITY, WEDNESDAY, OCT. 10, 1923
2 P.M.

Address of Welcome — President L. C. Datz, chief engineer Memphis Power & Light Company, Memphis, Tenn.

Report of Purchases and Stores Committee —B. J. Yungbluth, supervisor purchasing and supplies Philadelphia Rapid Transit Company, chairman.

Outline of Purpose and Constructive Work Planned by the Committee on Purchases and Stores—W. H. Staub. purchasing agent United Railways & Electric Company of Baltimore.

Proper Control and Handling of Materials and Supplies—P. F. McCall, superintendent of materials and supplies Chicago, North Shore & Milwaukee Railroad.

Convention Information

A CIRCULAR letter has been sent to all members of the American Electric Railway Association and affiliated associations by Secretary J. W. Welsh regarding plans made for the October convention at Atlantic City. With it are inclosed advance registration cards, indentification certificate for securing reduced railroad fares, copies of the proposed changes in the constitution to provide for the establishment of community section membership and for covering "no quorum" meetings of the executive committee, and an attractive leaflet entitled "All About the Forty-second Annual Convention." This folder gives a brief description of the various convention activities.

Special Reports Available

THE bureau of information and service, American Electric Railway Association, has prepared the following special reports, which are available to member companies in good standing upon request:

Cost of Living Studies.—A summary of reports of the National Industrial Conference Board, Bureau of Labor Statistics, Annalist Food Index, Gibson's Food Index, Dun's Wholesale Index and Bradstreet's Wholesale Index, showing present compared with prewar prices.

Protection of Railroad Crossings.—Part 1, laws of various states regarding elimination and protection of grade crossings; Part 2, court and commission decisions in cases involving apportionment of expense for the protection or elimination of grade crossings; local ordinances passed by cities regulating traffic over railroad and railway crossings; extracts from committee reports of the National Association of Railway and Utilities Commissioners.

Electric Railways Operating Motor Bus Lines.—A list of 107 electric railways that have adopted or propose to adopt motor buses or trackless trolleys either as auxiliaries or to supersede railway service in whole or in part.

Independent Motor Bus Routes.—A list of motor bus routes grouped according to geographical distribution, showing length of route, fare charged, number of buses operated and the type of bus.

Cost of Handling Materials and Supplies.—Gives the ratio of the value of materials and supplies on hand to gross revenues for a number of companies classified into three groups according to their size and their comparative stores department expenses (I. C. C. Account No. 95) per $1,000 of materials disbursed.

The Attitude of State Regulatory Commissions Toward Motor Bus Competition with Railways.—A study of the development of the policies of the various state commissions in regard to issuance of certificates of public convenience and necessity to motor bus operators.

Trend of Electric Railway Operations.—A month-by-month statement of the revenues, expenses, taxes, car mileage, passengers carried, operating ratio and average rate of fare of eighty companies since January, 1921, with charts showing the trend of the daily average number of passengers carried by these eighty companies since January, 1920, and the percentage variation.

Investment as the Basis of Rate Making.—A summary of court and commission decisions discussing the use of original investment as a measure of value for rate-making purposes.

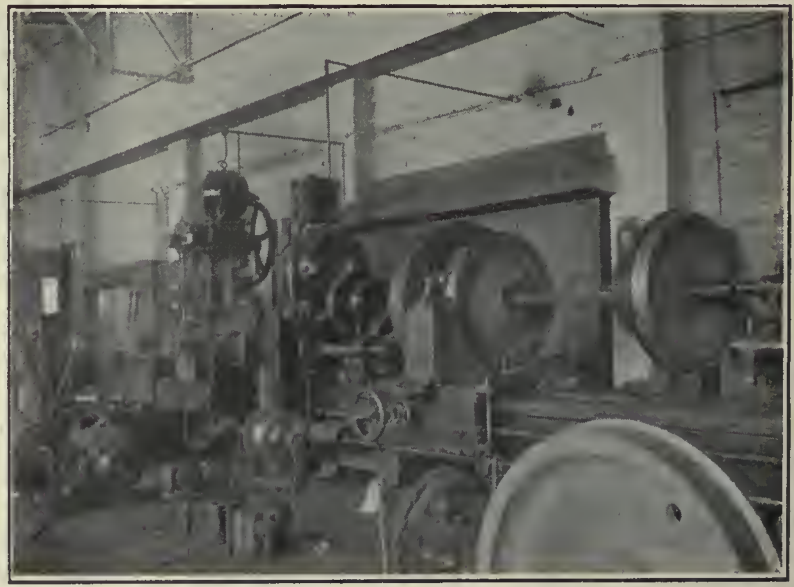
Maintenance of Equipment

Painting Shop Interiors

THE maintenance shops of the Ohio Valley Electric Railway, Huntington, W. Va., are far from gloomy, but the management believes that liberality in the use of good paint on walls, under sides of roofs, and even machines will have good effect in increasing illumination and adding cheerfulness to its shops. Experiments have been going on recently to determine a satisfactory method of coating brick walls, roof trusses, etc., with white paint in such a way that the whiteness will be retained. It was found that paint of the ordinary type soon stains and takes on the appearance of antiquated whitewash.

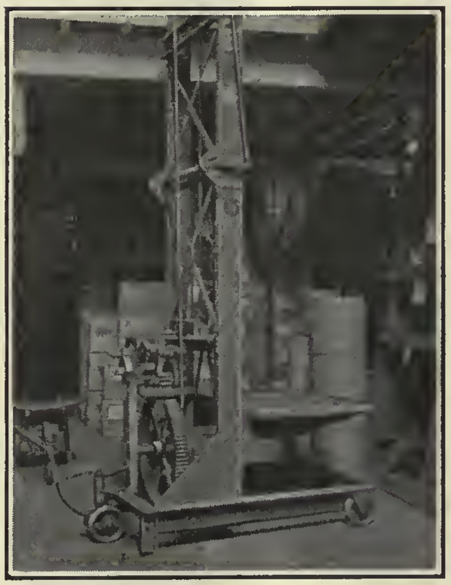
At present, two coats of a special white paint made by the Detroit Graphite Company are being applied on rough brick and steel, with apparently permanently satisfactory results. On woodwork an "outside white" made by the same company is used. This paint is put on by the spraying method, with apparatus furnished by the Paasche Air Brush Company of Chicago, Ill.

An unusual and very attractive effect is secured in the machine shop by painting all of the machine tools red. A brightly colored machine in the white walled and roofed room produces a pleasing effect which is undoubtedly reflected in the quality of the work done. Whether the general neatness of the shop has anything to do with the good painting or not is a question, but there may be some connection.



In the Shops at Huntington, W. Va., Unusual Care Is Being Given to the Painting of Walls and Other Reflecting Surfaces

Minimizing Lifting in the Storeroom



Convenient Device for Lifting Heavy Stock

THE Virginia Railway & Power Company is making improvements in its storeroom in Richmond, with a view to facilitating the taking of inventory and to handling materials more conveniently.

Among the materials-handling devices that have been found useful is the portable lift shown in the accompanying illustration. This is invaluable for raising materials to high bins or to a gallery. It consists of a platform sliding in guides and elevated by means of a steel cable passing over a sheave at the top and down to a drum, which is revolved by means of a crank through gearing. The lift is mounted on wheels and provided with a handle for pulling and steering. It is made by the Economy Engineering Company, Chicago, Ill.

Gear Cases Modified to Get Better Lubrication

LUBRICATION of railway motor gears and pinions is done ordinarily by placing grease or heavy oil in the bottom of the gear case. Sometimes sufficient grease is not placed in the gear case to insure good lubrication, and frequently some of the grease works out through the joints until the gear does not pick up enough to cover the teeth, leaving them dry. The result of the dry gears is excess noise and chattering, with resultant rapid wear.

A simple remedy has been provided by the West Penn Railways, Connellsville, Pa. This consists of cutting off the lower portion of the standard malleable iron gear case, and welding on a new bottom having a clearance of only about ¼ in. below the gear. This clearance has been found sufficient in practice, since there is no danger of loose parts falling into the case.

The result of this modification of the gear case is that the gear is lubricated so long as any grease at all remains in the case, and dry gears are unknown on the property. An incidental advantage is that the clearance between the track and the bottom of the gear case is increased several inches. As redesigned, the bottom of the gear case is above the bottom of the motor case, whereas in the standard design the gear case is the lower. This prevents damage to the gear cases, especially during the winter season, or when the paving has become broken and portions of it project above the general level.

A Dustproof Annex to the Paint Shop

IN ONE corner of its paint shop, the Chattanooga Railway & Light Company has built a dustproof brick and iron compartment or room for the painting of automobile bodies.

Fine Varnish Work Is Facilitated by Means of This Dustproof Room

Its appearance is shown in the accompanying illustration.

The brick part was built so as to include the two outside windows of the building, thus providing ample daylight illumination. For artificial lighting, powerful electric lights with reflectors were placed in such positions and at such angles as to give direct light on all parts of a job in process.

The roof was sloped so as to include the whole height of the windows without unnecessary height of the walls. It is of sheet iron, mounted on angle-iron rafters. The door is also of sheet iron, with a strong light framework of flat steel.

The room is wired in iron conduit. Steam radiation is provided sufficient to raise the temperature of the room above that of the shop.

New Equipment Available

Portable Bar for Boring Operations

A RECENT development in portable tools for railway shop use is the portable boring bar equipment just brought out by H. B. Underwood & Company, Philadelphia, Pa. Due to its light weight, compactness and the fact that it can be used in close quarters, this equipment is particularly useful for reboring motor housings and air compressor cylinders.

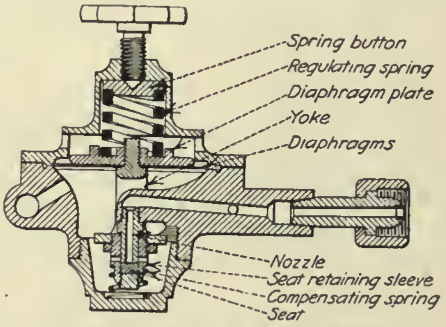
The boring bar equipment is of rugged construction and simple design involving few parts. The bearing plate carries a boring bar driving spindle and feed screw, mounted on a clamping ring, and a cutterhead. The pilot guide is screwed to the stuffing box and the bar placed in the cylinder. A clamping ring is securely fastened to the top flange of the cylinder by studs and nuts. Any inaccuracy in the position of the studs in the cylinder flange can be overcome by means of four thumb screws used for aligning the bar. The tool is adjusted and rigidly held in the cutterhead by tightening the collar screw which clamps the tool to the cutterhead by means of a simple clamp. The tool may be readily released when the cutterhead is at the lower end of the cylinder, if desired.

In boring cylinders the use of calipers is rendered unnecessary by use of a gage furnished with each bar. This provides a simple and practical method of setting the tool to the required position. In this manner a number of cylinders can be bored to accurate dimensions without loss of time.

The driving spindle is provided with a Morse taper shank to fit the air motor and drives a pinion which meshes with a gear keyed to the boring bar. A feed gear is keyed to the feed screw and meshes with a reverse gear journaled on a pin centered in the boring bar. The reverse gear turns freely on this pin, unless prevented by the feed pawl which holds the reverse gear stationary relative to the bar, and causes the feed gear to revolve the feed screw and advance the cutterhead into the work. To return the cutterhead to the top of the cylinder the air motor is placed on the shank of the reverse gear, which rapidly returns the cutterhead. The weight of an equipment for boring from 8½ in. to 11 in. diameters, without air motor, is approximately 140 lb.

New Line of Gas Welding Regulators

THE Torchweld Equipment Company, Chicago, Ill., announces a new line of welding and cutting regulators. One type, 2 in. in diameter, is fitted with a working pressure gage and with connections for cylinders or pipe lines. A second type, 2⅝ in. in diameter, is fitted with one working pressure gage and one gage for indicating cylinder pressure. This regulator is for use in oxy-acetylene cutting where the gases are delivered at their higher pressures. A third type, 3 in. in diameter, is fitted with either one working pressure gage or with two gages to show the cylinder pressure and gas delivery. This type is also fitted with connections for cylinders or pipe lines. A duplex regulator is also included in this new line. It is equipped with three gages, one for showing the oxygen cutting pressure, one the oxygen welding pressure, the third the cylinder pressure.



The Yoke Preserves the Alignment

Regulators of this new line are fitted with three diaphragms of graduated sizes. These diaphragms are clamped into position between the regulator body and bonnet, and are held tight when the bonnet screws are tightened. The accompanying illustration of regulator details shows how the yoke holding the regulator seat is guided by the nozzle to preserve the alignment of these two parts. This construction is of advantage on account of the number of times that the regulator nozzle and seat are brought together.

New Model Truck Mounted Air Cleaner

A NEW model, truck mounted, electrically operated vacuum cleaner has been announced by the United Electric Company of Canton, Ohio. The entire equipment is mounted upon rubber tired steel disk wheels, and is marketed under the trade name of Tuec. In the construction of this new model particular attention has been given to lightness and ease of handling. It has a small wheelbase, which permits ready operation through restricted aisles and narrow doorways. Where it is necessary to transport it from floor to floor it can readily be carried or placed in a small elevator. The regular set of tools furnished consists of flexible hose, aluminum tools and extension handles which afford easy access to bins, shelving, ceilings, walls, etc., which are ordinarily beyond the reach of the cleaner without the use of a stepladder. The portability of the outfit makes it suitable for cleaning car interiors, including seats and fittings.

New Model Truck Mounted Air Cleaner

The equipment is driven by a universal motor of 3-hp. capacity at 5,000 r.p.m. Motors are furnished for use either with 110 or 220 volts. A fan is attached to the lower end of the motor shaft, which has wide clearances and handles a large volume of air at high velocity with low power consumption. One dry separator is used. There are no water sprays, fine screens, by-passes, or appliances to reduce efficiency in construction, gravity alone being used in the separating medium.

One metal screen of coarse mesh is placed in a separating tank, which deflects the dirt from the fan. Two leakproof dust bags are mounted in the rear for air separation of finer dust which drops into the lower dust bag for ready removal.

A removable dust pan of ample capacity is provided in the bottom of the separating tank to catch the heavier dust and dirt deflected by the screen. A large door at the bottom of the tank gives easy access to this tank. There are but two bearings and these are of a high-grade, self-aligning ball-bearing type. The net weight of the new Tuec model is 280 lb., and it has an over-all height of 48 in., a width of 30 in., and a length of 36 in. The wheels are 30 in. in diameter.

Bringing Electrical Repairs to the Job

THE increased use of electric power for driving shop machinery has required a supply of fuses, motor brushes, wires, switches, etc., for maintenance repairs. Trouble at any point frequently requires several trips back and forth between the point and the electrical repair department, and sometimes the transporting of heavy motor parts.

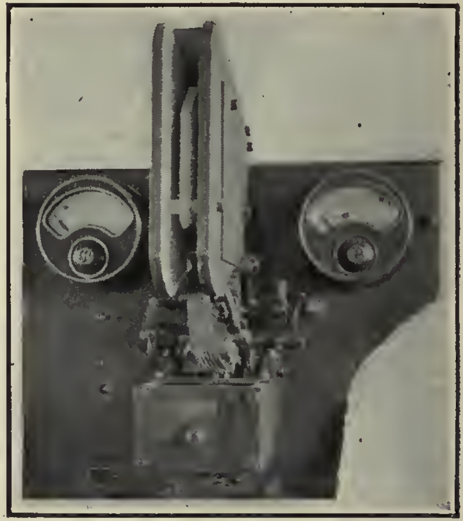
The Elwell-Parker Electric Company, Cleveland, Ohio, has taken a cue from these conditions to provide an electric industrial truck suitable for carrying necessary repair parts and provision for making repairs. As will be seen from the illustration, a steel and wood case occupies about two-thirds of the platform, while the balance is reserved for a motor and tool kit, with room for one or two repair men to ride. A pipe vise is mounted on a partitioned rack to enable the making of repairs.

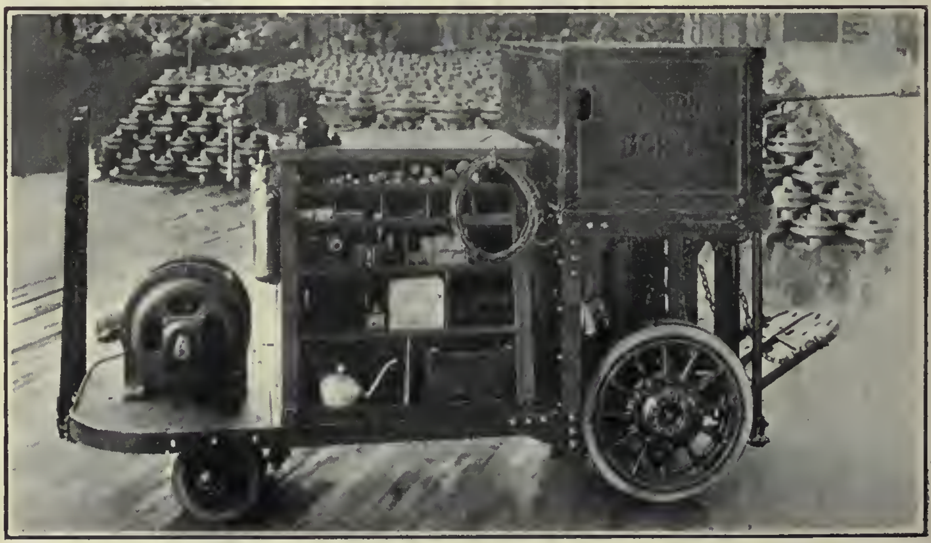
The truck is driven by a battery carried in a compartment over the large rubber-tired drive wheels. The operator can drive the truck and usually deliver necessary material right at the job, since it steers on all four wheels.

The truck cannot be started unless the operator is on the pedals, and the truck will stop within its own length if he steps off. The outfit is a valuable adjunct to the maintenance of electrical equipment in shops of sufficient size to warrant its use.

Counting Breaker Operations

THE number of operations performed by the various opening and closing devices on automatic switching equipment is being recorded in an interesting manner by means of a standard Veeder counter on installations which have been made recently by the General Electric Company. The illustration shows one of these counters connected to the circuit breaker mechanism of an automatic reclosing equipment. It will give an accurate record of the number of times this breaker opens or closes. By installing counters in connection with relay, contactors, etc., a complete check of operation may be shown which will lead to locating any faults.


Device for Recording Breaker Operations


Tractor Used for Carrying Maintenance Repair Parts

The News of the Industry

$1,000,000 for New Work

Railway at Fort Wayne Forging Ahead —Story of Improvements to Be Told to Public

Fifteen new double-truck front-entrance and rear-exit cars, being manufactured in St. Louis at a cost of $12,000 each, will be placed in service on Oct. 1 by the Indiana Service Corporation on its lines in Fort Wayne. These will be the first new front-entrance and rear-exit cars purchased for the Fort Wayne city lines for some time, as 80 per cent of all the cars operated on the Fort Wayne city lines are of the one-man type with both entrance and exit at the front.

The addition of the fifteen new cars to the Fort Wayne city lines will complete an expenditure of nearly $300,000 for new car equipment for the city of Fort Wayne as the Indiana Service Corporation last spring purchased for Fort Wayne fifteen one-man cars at a cost of $7,800 each.

The city is growing fast and its rates of four tickets for a quarter and the sale of weekly passes for $1 each account very largely for the need for the new equipment. At the present time the company is selling about 5,500 passes a week. This summer-time sale of passes compares very favorably with the peak sale of 7,600 passes a week which occurred in one week in March last.

$500,000 for Power Improvements

In addition to spending nearly $300,000 for new cars the Indiana Service Corporation is completing improvements at its power plant and carhouses totaling more than $500,000. At the power plant a 12,000-hp. turbine is now being installed. In recent years two 6,000-hp. turbines have been put into the plant. Ten years ago there were only two turbines of 1,500 hp. each. The new carhouse next to the power plant is going up at a rapid rate. It will cost more than $200,000.

The company has just completed the double tracking of South Calhoun Street at a cost of $77,000 and is preparing to begin double tracking Pontiac Street and extending the line to the International Harvester Company's plant at a cost of about $150,000. In addition to this a franchise has just been granted by the Board of Public Works at Fort Wayne for a double-track line on Lafayette Street. This will give the corporation another line to the fast-growing south side of the city.

In addition to making all these improvements the Indiana Service Corporation is going deeply into the problem of "selling" all these additions to the general public. It is felt by officials that the public should be told about the things in an interesting and entertaining way so that a deep and lasting impression may be made. It is believed by the traction officials that the institution of the weekly pass had much to do with improving the feeling of the public toward the company. While the average man may not actually ride more during the week now than he did formerly, still he knows that there is no limit to the amount of riding he can do and he accordingly feels that he is getting his money's worth for his purchase. This desire on the part of the corporation to tell the public what it is doing has led it to institute a rather extensive publicity and advertising campaign, which is to be put in charge of a man hired expressly for the purpose of handling it.

Public to Be Told

Some of the stories which are to be prepared and printed have already been outlined. For instance, one of them is to be a story of what has been done underground at the power plant. This story will carry a diagram or map showing the underground activities and will tell how long it took to carry through the various portions of the work and just what was accomplished by the work. Another story will tell about some electric switches which are to be installed at the main transfer corner at the corner of Main and Calhoun Streets. And so on.

It is also planned to use a double-page spread in the local papers at the time the new cars are put in service, and the principal feature of this advertisement will be a drawing showing an exterior view of the car and another drawing showing the seating arrangement and indicating just how the car will be operated, where the fare will be paid and how the rear exit will be operated. Also there will be a list of the lines on which the cars will be run, together with a complete timetable showing the schedule for the various lines.

Letters will be sent out to all the auto owners in the county when the new cars are placed in service telling them to watch for people alighting from the rear ends of the cars instead of at the front ends.

The company is now using car cards regularly for the purpose of "selling" its service to the public and is also going to put on an anti-jay-walking campaign.

J. Allen Greenland, superintendent of transportation, has direct charge of the company's publicity work.

Directors Named

Financing Plan of Saginaw Transit Company Before the Public Utilities Commission for Approval

Six of the nine directors of the Saginaw Transit Company who will govern the affairs of the company that will furnish street car-bus transportation under the terms of the franchise that was approved by the electors on June 25 have been named by the Mayor and two local circuit judges. Those who will finance the new company have approved them. They are: A. A. Alderton, secretary and treasurer of a wholesale grocery company; Charles C. G. Christensen, proprietor of a general store; Henry T. Robinson, cashier of a local bank; William C. Wiechmann, proprietor of a department store; E. Walter Secord, business agent for the carpenters' union, and John Troy, general foreman of boilers of the Père Marquette Railroad, where he has been employed for forty years.

The company's three men have not been named. The selection will be made without regard to the city.

Financing Before Commission

Financing of the company is now before the Michigan Public Utilities Commission. The petition was filed and testimony was taken by the commission Aug. 30, and an early decision was promised by the commission. It is expected that the plan of financing will be approved and immediately afterward the temporary organization that has been at work will then resign and the new directors, who will be permanent, will then take office.

The franchise provided that the directors could serve only after two-thirds of their number had the approval of the Mayor and two circuit judges. After many conferences these officers presented the company representatives with the six men they would approve, which apparently was satisfactory to all concerned.

This action is contrary to the expectations of those who during the last two years fought the return of street cars in Saginaw. They asserted time and time again that such a proposal was only made to catch votes and those who would finance the project could not be expected to allow outsiders to operate their business. But this apparently is just what has occurred and the announcement of the personnel of the board has created considerable comment locally as it is entirely different from what was expected. One thing is certain, the city's members are all friendly to the cause of street cars.

Conditions Existing Along the Bamberger Electric Line Right After the Flood

Floods in Utah

As a result of a terrific thunderstorm and cloudburst which struck the canyons east of Farmington and Willard, Utah, on the evening of Aug. 13 several lives were lost and many thousands of dollars worth of property destroyed.

At Farmington, which is on the line of the Bamberger Electric, about half way between Salt Lake City and Ogden, a wall of water estimated to be between 20 and 30 ft. high rushed down the canyon, drowning seven persons and depositing many hundreds of tons of boulders, mud and débris across some of the farms in its path and completely blockading the state highway and the tracks of the Bamberger Electric. It required forty-eight hours of unceasing labor on the part of some of the railroad company's employees to clear the tracks. For several days thereafter the electric road was the only means of transportation, its facilities being used to good advantage in relieving flood sufferers, in the transportation of passengers, supplies, etc.

At Willard, Utah, about 30 miles farther north, on the line of the Utah-Idaho Central, similar conditions were brought about as a result of the heavy storm. There two lives were lost and much property destroyed. After the tracks of the electric road were cleared its trains were the only means of transportation until the state highway could be cleared, and the right-of-way of the railroad was offered and used as a highway for automobile traffic for two hours each day.

Substantial recognition of their services in this emergency was received by about twenty employees of the Bamberger Electric Railroad. These men, ranging from superintendent to section foreman, were working on a monthly basis for the railroad. During and after the flood in the vicinity of Farmington they worked early and late to get the road in running order. They had no reason to expect any overtime or other compensation and were agreeably surprised when they received personal letters signed by former Gov. Simon Bamberger, chairman of the board of directors, enclosing checks as rewards for faithful services. The men working on a daily basis were paid for all the overtime they put in.

The letter from Mr. Bamberger to the men read as follows:

> Your extraordinary efforts in assisting in getting our line open to service after the terrible catastrophe of Aug. 13 are very much appreciated, and I am pleased to enclose a more tangible expression of our thanks.

A Tribute to Warren G. Harding

Electric railways throughout the country joined in paying tribute to our deceased President on Friday, Aug. 10. In many cases the operation of trains and cars was suspended for a short period at the time services were being conducted in Marion, and in some cases passengers on cars were requested to join with the employees in observing the day. Company publications, in many instances, paid a tribute to the Chief Executive, reviewing his achievements as a leader and as a man. An instance of the extent to which some companies went in paying tribute to the late President was evidenced by the exercises undertaken by the Eastern Massachusetts Street Railway.

At the Fall River district cars were run on Sunday time and the offices were closed. The cars stopped for a minute at 5 p.m. and all operators bowed their heads. All passengers on the cars at that time were asked to join with the operators in standing, bowed and silent, for one minute. In addition to these exercises one of the greatest factors in keeping before the minds of the people the significance of the day was the placing of dasher signs on both ends of every car carrying the picture of the late President.

A Semblance of Order Being Restored After the Flood

Trackless Trolley for Rochester

Ordinance Passed by Council for Operation of Trackless Cars for Four Months Trial

An ordinance authorizing the operation of trackless trolleys on a crosstown route in the city of Rochester, N. Y., for a four months trial period was passed by the Common Council on Aug. 28. The ordinance permits the Rochester Railways Co-ordinated Bus Lines, Inc., to operate the route from Sept. 5 to Jan. 5, 1924. The bus company is a subsidiary of the New York State Railways.

Considerable agitation has resulted from the opposition of certain residents of the section to be traversed by the line, who have appealed to the city for gasoline buses instead of the trackless cars.

James F. Hamilton, president of the New York Railways, declares that if the trackless trolleys prove unsatisfactory at the end of the trial period, crosstown service will be abandoned and the trolley buses removed to Utica and Syracuse, which cities, he says, would be very glad, indeed, to have this service. It is his belief, however, that after a trial under the limited franchise, the new trackless car line will prove to be not only more economical but also entirely satisfactory from the service point of view.

It is expected that the line will begin operation within the next few weeks. The route will traverse the northern section of the city and will provide crosstown service, connecting the parts of the city on the opposite sides of the Genesee River, by way of Driving Park Avenue bridge. It will serve a rapidly developing industrial and residential section.

At the same meeting of the Council, the law and finance committee recommended a judicial review of the appraisal of the property of the railways in Rochester under which the service-at-cost contract, now in operation, was formulated.

Seattle Trainmen No Longer on Monthly Basis

Trainmen of the Seattle Municipal Railway have lost their fight to keep their wages on the monthly basis, but the City Council has voted to recommend the establishment of "one day off in eight" without pay for trainmen. Representatives of the union appeared before the Council to discuss further the request of the trainmen for an increase to 68 cents an hour from the 66 cents recently voted by the budget committee, but the request was denied.

Rates of pay were fixed by the Council at 56 cents an hour for beginners, with a pay of 63 cents an hour at the end of the second year and a maximum pay of 66 cents an hour. Former rates of pay were 56¼ cents an hour for men while learning, a rate of 60½ cents an hour at the end of the instruction period, 62½ cents an hour at the end of the second year and a maximum of 64¾ cents an hour.

The budget committee states that the change in pay and one day off in eight will make no difference in the budget. Request of the shopmen for slight increases were granted in some instances, but the request for a two weeks vacation with pay was denied.

D. W. Henderson, superintendent of the railways, will be officially instructed to train sufficient men to relieve the platform men on their day off. It is estimated that the number needed is 150.

New Wage Contract Signed in St. Louis

A new wage agreement has been entered into by the receiver of the United Railways and the Amalgamated Association, whereby first year motormen and conductors retain the pay of 50 cents an hour, a raise from 55 to 56 cents for second year men, a raise from 60 to 62 cents for third year men and a raise from 65 to 67 cents for older employees. The men had asked 55, 60 and 65 cents.

Shop and carhouse employees received advances ranging from 2 to 6½ cents an hour.

Only minor changes were made in working conditions under the renewed annual contract, which is retroactive to July 1.

About 5,000 men are affected by the contract, but only 1,225 attended the union meetings and voted on it on Aug. 27, the contract being ratified by 1,031 to 194.

Columbus Railway Believes Perpetual Franchises Benefit City

In an effort to present the facts and to dispel misinformation, the Columbus Railway, Power & Light Company, Columbus, Ohio, has recently issued some advertising matter which calls the attention of the public to the desires of the company to give the best service possible. The company says that it wants to be considered as a part of and not apart from the community. The matter of the perpetual railway contracts in Columbus is explained fully in the advertisements giving the history of the making of these contracts, which were started some fifty or seventy years ago. The advertising by the company is its answer to the moves under way looking toward a surrender of the perpetual franchise. Against those who are opposed to perpetual franchises the company champions this method of contract. It claims that it has been able to borrow money at a lower rate of interest than many other similar companies in the country because of its perpetual franchise. Further, that it has enabled the company to operate on extremely low rates of fare, the present rate of fare being nearly 40 per cent less than the average rate of fare in all the larger cities of the country, besides giving a free transfer. The company contends that it has not sought, or will not seek, in any way to take advantage of the public, but believes that the public, when fully informed, will act fairly toward the company.

Another Railway Adopts the Bus

Over at the Fair Grounds in Brattleboro, Vt., are five street car bodies. Removed from their trucks they are being used as ticket selling stands and concession booths. Up to Aug. 28 the bodies mounted on their trucks were in regular service in that city transporting passengers for public hire. The following day the lines over which the cars were run were thrown in the scrap heap and the new motor bus line began operating for the first time. The buses ran at thirty-minute intervals, an improvement of ten minutes over the street car schedule. The tracks, which have served the public for thirty-five years, with the trolley wires and poles will be removed soon. The railway has promised to place the roadbed previously occupied by it in as good shape and condition as the adjacent roadbed. An investment of about $27,000 has been made by the Twin States Gas & Electric Company in establishing the bus line, and $7,000 more will be expended in the building of a suitable garage to house the vehicles.

Vancouver Men Seek Ten per Cent Increase

Platform men of the British Columbia Electric Railway, Vancouver, B. C., recently requested a 10 per cent increase in wages, reinstating the terms of the agreement prior to January, 1922, when the company obtained a reduction. A conciliation board is now sitting, consisting of A. M. Pound, a local broker, as chairman; A. G. McCandless, representing the company, and R. P. Pettipiece, representing the men. This board, appointed under the industrial disputes act of Canada, has no power of enforcing its findings upon either party.

Among the requests of the men is one for a modification of the working conditions. They claim that since overtime rates were reduced from double time to time and a half, the company has increased its use of men in overtime hours considerably. This the company denies. The reinstatement of the 10 per cent is asked on the basis of the alleged advance in the cost of living. The added strain of work with the increase in traffic on streets is also cited as a reason for higher wages. Another request is to have four motor bus operators included in the union. Protests were made by the men's representatives that the company used non-union men in its construction gangs and paid lower wages than were paid civic gangs. On a recent job, rushed through by the company on a main thoroughfare, the union representatives claimed that "slave-driving conditions" obtained. On the other hand, the company had obtained credit for performing the work efficiently and expeditiously.

Test of Endurance

Public Officials in New Jersey Cite Railway for Contempt of Alleged Contractual Obligations

Moves made in the last few days on the part of various public authorities in connection with the suspension of railway service in New Jersey have been of a punitive rather than a conciliatory nature. There have been several moves on the part of public officials toward placing both the Public Service Railway and the Public Service Railroad in receivership, but the hope behind these actions appears to lie in so-called technical default of their public obligations by the companies rather than for financial reasons. The proceedings involving the railroad and the railway are entirely different in nature. One has in mind a direct receivership for the railroad, while the other has in mind ultimate receivership for the railway if *quo warranto* proceedings fail. So far as the company is concerned it is still resting its case on the basis of its settlement offer.

The idea behind the attempt to bring about receiverships is that this would bring resumption of service under the direction of the court. The proposed actions against the two companies, as noted previously, are to be brought on different grounds, but they have for their object the same thing, namely, resumption of railway service. This is, in fact, the insistent cry nearly everywhere throughout the State, but the very insistence of the municipal authorities on their program that service be resumed first and terms of settlement then be discussed has not advanced matters a step so far as the principals to the controversy are concerned.

On its part the Board of Public Utility Commissioners, in replying to the railway's statement filed in the mandamus action seeking to compel the company to resume, contends that the attack upon the board by the company contained in its answer is entirely immaterial and plainly designed to cloud the issue. The board says that the sole question at issue is whether it is practicable, under the rate fixed by the District Court of the United States, for the company to afford service to the public pending an adjustment of its present difficulties. It regards the refusal of the company to resume service as an effort to club the public into accepting a demand arbitrarily made as a condition upon which it will resume. The board says that the company's statement is absolutely false that the commission has approved licenses for buses to operate in unlawful competition with the railway. In conclusion the commission says that the answer of the company in the mandamus action brought by the board does not meet the issue before the Supreme Court, viz., whether it is practicable to supply service.

This briefly summarizes the board's answer to the railway. On its own part the commission has instructed its counsel to petition the United States District Court to dismiss the pending proceeding under which the railway was empowered to put into effect a base rate of 8 cents. The legal grounds upon which this move is predicated are that the company has ceased to operate and that it has submitted a plan of settlement involving a fare lower than that allowed to the railway in the federal litigation. The commission says in short that the company's plan of settlement involves placing the problem of rates upon a new basis and constitutes an abandonment of the remedy it sought in the Federal Courts.

Early in the week it appeared that in Camden, where the buses charge a 7-cent fare, there might be an early separate peace with the company, but these hopes were not realized.

In Newark City Commissioner Raymond has issued emergency permits for 200 omnibuses. These permits, which are for six months duration, will be considered by the Public Utility Commission on Sept. 11.

Most of the newspapers in their editorial comments emphasize again and again that in reality the cities and the company are not really so far apart on the fundamental matters contained in the plan of the company, but despite this seeming nearness the matter appears at this writing to have reduced itself to a test of endurance.

The Electrical Trade Tie-in with the Jersey Shutdown

How the electrical trade in New Jersey is interested in bringing a settlement of the transportation situation in favor of the railway, and why all parties in the electrical trade should support the railways' plan, are brought to the attention of the trade by the following statement. It appears in *Nelectra-Grams* published by the Newark Electrical Supply Company:

> Street car development kept pace and kept ahead of the other economic development of the state until jitney competition undermined the structure of the street railway system. Where street car systems create values, jitney lines merely cash in on existing values. There is no doubt but what there is a practical place for jitneys in the transportation system of New Jersey, but jitney transportation is only a constructive factor in the economic development of the territory if it is operated in conjunction with, and in co-operation with, and completely co-ordinated with the street car system.
>
> The plan of settlement of the transportation crisis as submitted to the State Board of Public Utility Commissioners by the Public Service Railway Company, is of such character that it provides fair consideration and fair compensation to all parties concerned. It is reported that the striking street railway employees have endorsed the plan substantially as submitted. Every thinking citizen of the affected communities cannot help but be in favor of it. It is up to the public to convey to the Public Utility Commission its opinion on the subject.
>
> You are asking just why all this from an electrical supply house. Here is the answer: The Public Service Railway Company is an integral part of the Public Service Corporation. Jitney competition during the last few years built up increasing deficits in the cost of street railway operation, which deficits had to be paid out of the pockets of the Public Service Electric Company. A self-sustaining railway company means that the electric company can devote its funds to developing electric power houses and transmission lines. The more transmission lines and the easier it is for the householders and home owners to buy electric service, the more houses will be wired; the more appliances will be sold, and the better will be the business of every electrical contractor-dealer.
>
> As a matter of self-preservation, you should support the Public Service Railway Company in its efforts to secure a basis of operation which will protect its thousands of stockholders against loss, and enable the Railway Company to be self-sustaining. Before you put this *Nelectra-Grams* aside, write the Public Service Railway Company, telling them that you consider their plan of settlement fair, and that you are endorsing the basic principles conveyed in that plant. By so doing you will help the electrical industry in this territory which can only prosper in direct proportion to the way that Public Service Corporation prospers.

Few Casualties Among American Business Men in Japan

Nobody knows the real extent of the damage done by the earthquake and fire in Japan. The loss of life and property damage are appalling in their extent, but the later accounts of the disaster indicate the first reports, particularly those relating to the estimates of the loss of life, were exaggerated. In the electrical trades the principal companies doing business with permanent representatives abroad were the General Electric, Westinghouse and Western Electric.

The General Electric Company has received a cablegram from that country saying that all its representatives are safe, although some were injured. With their families the General Electric men, who escaped in a boat from the scene of destruction, are now on their way back to the United States. The company had about fifteen Americans stationed in Yokohama and a smaller number in Tokio.

The Westinghouse company has received a cable from Shanghai saying that its Japanese representatives are safe. The company had about six men stationed in Japan, four at Tokio and two being engineers engaged in installation work.

The Western Electric Company has been unable to get any direct word from its employees except a cablegram from Kobe relating to its comptroller, E. S. G. Elliott, and his family, who are safe. A newspaper dispatch published on Thursday said that W. T. Blume of the General Electric Company had been killed. Mr. Blume, however, was a Western Electric Company man. The Western Electric Company operated a factory in Tokio employing 1,200 operators with a staff of four Americans, but the district in which this plant was situated was practically undamaged. P. K. Condit, vice-president of the International Western Electric Company, was expected to arrive in Tokio on the day of the earthquake, and considerable anxiety is felt as to his safety.

So far as the property damage is concerned, the extent to which the public utilities have suffered will necessarily not be known for some time as all the present efforts toward restoring order are entirely of a temporary nature, having for their first aim the lending of succor to the suffering.

Foreign News

French Company Will Extend Lines

The Compagnie Générale Française de Tramways, which operates street car lines in four chief provincial cities of France—Marseilles, Nancy, Le Havre and Orleans—is increasing its capital from 50,000,000 francs to 75,000,000 francs. The increase was made necessary by conventions passed recently with the municipalities of Marseilles and Le Havre, where in each case it had been agreed to develop various suburban lines. It is to be remarked that interurban electric railways are something scarcely to be noted in France save in the contiguous Lille-Roubaix-Tourcoing district, largely intermarried industrial communities where there is an intense interchange of traffic.

Above all, the situation in Marseilles is one that requires as early a solution as possible. The city is extending its habitable limits far beyond that reached by the street car lines and with the exception of the intercity lines running to Aubagne on the east and to Aix-en-Provence on the north, 12 or 15 miles in each case, there is practically no catering to suburban traffic. Accommodation by the single line of railway centering at Marseilles, the Paris, Lyons & Mediterranean, which is only just beginning its electrification program, is wholly inadequate with respect to its Marseilles suburban stations and in fact does not reach many outlying communities, which are entirely bereft of any means of public service communication. The municipality of Marseilles is to advance the company 40,000,000 francs for the immediate undertaking of the required extensions, while Le Havre is to advance 10,000,000 francs for work to be carried out there.

Profit Sharing in Public Service Concessions in France

The permanent Council of Labor, recently in session, passed a motion calling upon national, state and county authorities to grant franchises for public service concessions—light railways, heat, light and power, omnibus routes, gas companies, etc.—only upon the acceptation of a clause which shall provide for the sharing of profits with employees of whatever rank who may be associated with the enterprise. It was recommended that a law be passed by the national government to this effect and that this law should state clearly the conditions under which such profit sharing should apply, flexibility of the law, in the sense that it would permit the directors to take advantage of the means to widen the scope or increase the volume of business, being as desirable for the employee as for the employer. The platform appears to have been most liberally conceived and is in no way to be considered as antagonistic to capital and employer as being the concurrent elements to the employee.

Electrification of Finnish Railways Progressing

According to the director of the Finnish State Railways, the question of the electrification of the State railways, which has been in abeyance for some time, will soon be taken up, as the work on the power station at Imatra has advanced so far that preliminary arrangements have already been made for obtaining turbines and power machines. The State Railways must therefore hurry this matter forward. It is intended to electrify first the local lines near Helsingfors and then the long-distance line, particularly Helsingfors-Systerback. The project, however, is still very indefinite.

First Important Electrification in Central Africa

The Department of Commerce at Washington has received from Consul-General H. M. Morgan of Brussels the statement by the Belgian Minister of Colonies on the electrification of the Leopoldville - Matadi Railroad. According to his statement this will be the first important railroad in Central Africa to be electrified. For the electrification of the railroad 30,000 hp. will suffice, at least in the beginning. It is estimated that the money required for this project will be 150,000,000 francs. The gage of the line is at present 75 cm. It is impossible, for technical reasons, to electrify the line efficiently unless the gage is made at least 1.06 m. "Consequently," says the statement, "the widening of the lines will have to be undertaken before any other work is begun."

Electrification in Sweden Extensive

Electric power is furnished to 40 per cent of the total area of Sweden, according to the Government Committee for Information on Electrified Acreage. The present annual consumption of electric power by rural Sweden is 110,000,000 kw.-hr., while the total consumption of the country is approximately 390,000,000 kw.-hr. This committee has reported also on the possibility of electrifying the island of Gottland off the west coast of Sweden and recommends the establishment of a plant near the town of Tingstade, where large deposits of peat would afford cheap and satisfactory fuel.

Private Operation Being Considered in Milan

Reversion to private operation of the Milan tramway system will be discussed before the Municipal Council of that city. Although a surplus will be earned this year, the general feeling is that utilities had better be operated by private companies because they are then less affected by politics. The example of the municipal electric light and power service of Milan, which from a very successful undertaking had been brought to the verge of ruin by the former socialistic city administration, is recognized by the public, who compare its rather irregular service with the much better and more reliable Edison service.

The only consideration that is adverse to a return to private operations is that a company would not perhaps consider building extensions unless these should appear to show an early profit, and new street railway lines are necessary to the growth of Milan, which now has more than 750,000 inhabitants within its corporate limits.

The street railway tracks in Milan are generally in very good condition and so are the cars, though many are of small capacity and somewhat obsolete in type. Fares, which are straight, are 40 centesimi during the day (about 2 cents at actual exchange) with return tickets sold for 40 centesimi before 9 a.m., entitling to a return trip in opposite direction within the same day after 9 a.m. The municipal tramways system consists of about 1,300 cars operated over forty different routes.

Will Extend Weekly Pass

The weekly pass has proved so popular from a public and operating standpoint on the Lidget Green route of the Bradford Corporation Tramways, Bradford, England, that it has been decided to extend the plan to other routes at an early date. The revenues for the first four weeks, beginning June 18, on the test route were respectively £546, £556, £557 and £557, while pass sales at 2 shillings (48 cents) per pass were 897, 950, 941 and 923. The additional routes for two months trial are Thornton, Allerton and Duckworth Lane. The last named will have the same price pass as Lidget Green, since it is also a single fare 1.5d. (3 cents) route. The others will have a two-zone pass in addition, at a price yet to be determined.

Fares on Gold Basis

A car ride in Cologne now costs 33 gold pfennigs, in contrast to the rate of only 10 pfennigs before the war. Fares are now determined on a gold basis, in order to protect the city against losses resulting from the depreciating paper mark. It is said now that an electric railway ride has come to be considered a real luxury for the average man, who is paid his wage in paper marks.

Financial and Corporate

Net Income Up $490,497

Brooklyn City Railroad's Report for the Year Shows the Company to Be Making Remarkable Record

The gross revenues from transportation of the Brooklyn City Railroad for the year ended June 30, 1923, increased approximately $300,000 during the year, with no increase in fares, the average receipts per passenger being 4.68 cents. There was an increase of approximately $30,000 in the cost of operating cars, due to increased service and to the higher wages paid the employees.

The net corporate income of the Brooklyn City Railroad (excluding the Brooklyn City Development Corporation), after providing for all operating expenses, maintenance, taxes, bond interest and reserves, amounted to $2,256,025. This was an increase of $490,497 compared with the previous year.

INCOME STATEMENT
BROOKLYN CITY RAILROAD AND BROOKLYN CITY DEVELOPMENT CORPORATION

	Consolidated Fiacal Year Ended June 30, 1923	Brooklyn City Railroad only Fiscal Year Ended June 30, 1922
Passenger revenue	$11,715,813	$11,413,403
Other car revenue	150	247
Total transportation revenue	$11,715,963	$11,413,650
Advertising and other privilegea	$85,872	$100,006
Rent of land, buildings, etc.	131,660	127,498
Rent of tracks and terminals	50,753	46,053
Miscellaneous revenue	2,004	543
Total operating revenue	$11,986,252	$11,687,750
Operating Expenses		
Maintenance—way and structures	$1,246,178	$1,203,976
Equipment	1,404,315	1,368,204
Power	1,023,282	986,910
Operation of cars	3,865,305	3,835,850
Injuries to peraons and property	419,436	524,309
General and miscellaneous expenses	512,592	530,972
Total operating expenses	$8,471,108	$8,450,221
Net operating revenue	$3,515,143	$3,237,529
Taxea assignable to operation	889,532	931,521
Operating income	$2,625,611	$2,306,008
Non-operating income	210,942	160,950
Gross income	$2,836,553	$2,466,958
Income Deductions		
Interest	$367,454	$428,319
Rent of cars, tracks, etc.	213,884	273,111
Total income deductions	$581,338	$701,430
Net income	$2,255,215	$1,765,528

During the year the company carried 250,700,975 passengers, an increase of 7,162,508 passengers as compared with the previous year. Expressed in another way, the company carried approximately 100,000 more passengers on every business day of the year ending June 30, 1923, as compared with the period ending June 30, 1921.

During the year the company expended for maintenance or credited to the reserve therefor $2,606,640, thus adequately meeting all current maintenance in addition to providing for the deferred maintenance which had accumulated at the time the property was returned in October, 1919.

The company is now engaged in the reconstruction of 68,760 ft. of track system, the old 94-lb. rail being replaced with new rail weighing 122 lb. per yard.

The payment of dividends on the stock of the company was resumed during the year. Three quarterly dividends of 2 per cent each were paid respectively on Dec. 15, 1922; March 1 and June 1, 1923.

In view of the increased earnings and the resumption of dividends, the directors determined in November, 1922, to suspend the collection of a second fare on the Flatbush Avenue Line at Foster Avenue. This and the generally better and more frequent service given have enabled the public to share with the company the results of its prosperity.

The Brooklyn City Development Corporation, all of the capital stock of which is owned by the Brooklyn City Railroad free and clear of liens of any kind, has contracted for the delivery in the early autumn of 200 new passenger cars of the most modern type. The company is also converting fifty-four center-entrance trail cars into motor cars, traffic conditions being such that the public can be better accommodated by more frequent service of single motor cars than by the operation of cars and trailers at longer intervals. Seventy-five semi-convertible motor cars have been rebuilt into prepayment one-man-two-man cars and are now rendering satisfactory service. This has enabled the company to dispose of twenty-five of its small single-truck safety cars that were no longer needed.

Operation to Cease in Trinidad

After requests covering three years, the Trinidad (Col.) Electric Transmission, Railway & Gas Company has been granted permission to discontinue all its city and interurban railway lines by the Colorado Public Utilities Commission. The decision was announced on Sept. 1. Cessation of service will be permitted after Sept. 15, thus cutting off Sopris, Cokedale and other large coal mining camps in the southern part of the state.

Discontinuance was originally requested by the company on May 10, 1920. The application was renewed in November, 1921. Hearings on the last request were started in May of this year when it was shown that the company had lost more than $22,000 in 1922. The abandonment was opposed by the city administration in Trinidad, the Chamber of Commerce and other civic organizations.

According to W. P. Southard, general manager of the company, it is not known whether the trackage will be torn up or be allowed to remain pending a period when operation might again be made profitable.

Passengers and Net Income Decrease in Detroit

The total operating revenue of the City of Detroit, Department of Street Railways, for July, 1923, was $1,764,174 compared with $1,584,795 for the same month a year ago. Included in the first figure is $1,660,055 covering revenue from transportation for July of this year. The total operating expenses amounted to $1,299,326 in July, 1923, compared with $1,103,441 in the same month a year ago. The net revenue from railway operations was $464,848, a small decrease compared with the same month a year ago, when it was $481,354. The net income shows a considerable falling off as compared with July, 1922. In that month it was $100,892 and in July, 1923, it was $30,951. The total passengers carried in July of the current year was 40,934,203, while 36,904,425 passengers were carried in July, 1922.

Accuses Men of Blocking Bonafide Reorganization

R. Floyd Clinch, a local member of the protective committee under the reorganization plan of the Chicago Elevated Railway, made a statement in answer to the announcement that the Chicago Elevated Railways preferred stockholders' committee threatened legal action against the proposed plan submitted by the noteholders' protective committee.

Mr. Clinch said that the stockholders' list showed only three of the preferred stockholders' committee as being stockholders; that two of these three acquired their stock within the last three months and at a time when it was generally known that the reorganization was under way and also that the company's finances, generally, were in bad shape and that the preferred stock had little or no value.

Further that the oldest stockholder of this so-called committee purchased his stock beginning in March, 1922, and even at that time the financial condition of the companies was generally known and reflected by the market. These gentlemen, he said, all told, own only about 2,600 shares, which were mostly purchased at a time when the market was at a nominal figure and probably $3 or less a share. It was his opinion that these men were now trying to block a bonafide reorganization which was in the interest of the properties and public alike.

It will be recalled that the time for making deposits under the terms of the reorganization has been extended.

Charleston Interurban Acquires Kanawha Valley

The entire common capital stock of the Kanawha Valley Traction Company has been acquired by the Charleston Interurban Railroad. Announcement to this effect has been made by Robert Garrett & Sons, Baltimore, who handled the transaction. Five thousand shares of a par value of $100 were involved.

The Charleston company has heretofore leased the properties of the Kanawha Valley Traction Company, comprising the railway system in the city of Charleston, W. Va., and the interurban lines connecting therewith a number of towns and villages in the surrounding territory of Kanawha County, under a ninety-nine-year lease with a privilege of purchase.

The steady growth in the business of the company and the plans for further development in the future have made it advisable and advantageous for the company to acquire the above-mentioned stock, so that it will be sole owner as well as operator of the property.

The plans contemplate an extension of its lines to serve a section which is well developed beyond its present radius. Provision is also made for necessary funds through a sale to patrons and employees of a new issue of preferred stock. This will give the company the benefit of closer financial relations with the communities which it serves and at the same time increase the security behind the bonds.

The earnings of the company for the six months ended June 30, 1923, which have recently been reported, show:

Gross receipts	$489,564
Operating expenses and taxes	339,327
Gross income	$150,237
Bond interest	59,102

Refuses Purchase Price for Rate-Making Purposes

The Missouri Public Service Commission on Aug. 8 declined to accept the purchase price of a public utility as a fair valuation for rate-making purposes. This decision was in the case of the purchase by the Public Service Company of Missouri from the Watts Engineering Company of the gas plant and property at Columbia, Mo. The purchase price of $130,000 was approved conditioned upon the purchasing company amortizing within twenty years out of its earnings the excess of $16,000 of the purchase price above the commission's rate-making valuation of $114,000. The order specifically stated that the commission would not consider the purchase price as a rate-making basis, or as acquiescence by the commission in the value placed upon the property in the present transaction and that nothing in the order shall be construed as an approval of the rates now charged for service at Columbia nor as a finding that the present rates are not excessive and not discriminatory. Consumers at Columbia had complained to the commission that the amount paid for the utility was too high and might be urged later as a basis for increased gas rates.

New Company to Take Over Doherty Colorado Properties

The Cities Service Company, New York, N. Y., H. L. Doherty & Company fiscal agents, has organized a new company, the Public Service Company of Colorado, to acquire through an exchange of stock the Denver Gas & Electric Light Company of Denver, the Western Light & Power Company of Boulder and a new power plant development at Valmount, Col. The merger plans parallel in some ways a consolidation two years ago of nine public utilities in Ohio under the name of the Ohio Public Service Company.

The Colorado merger plans provide for financing the completion of the big plant at Valmount, which is designed for an ultimate capacity of 200,000 kw., and for joining the Denver and Boulder properties with high-tension transmission lines. An Eastern group of bankers has underwritten the financial requirements. The capitalization will consist of $3,500,000 of 7 per cent preferred stock and $15,000,000 of common stock.

Holders of the Denver Gas & Electric Light Company have received a letter as to the terms of stock exchange. The 6 per cent cumulative preferred stock of that company will be exchanged on a share for share basis for the 7 per cent preferred stock of the new company. Western Light & Power Company 7 per cent cumulative preferred stock will be exchanged share for share plus par in the new preferred stock for cumulative dividends on the old stock. The Western Light & Power Company, with operating offices at Boulder, runs the local railway there.

Auction Sales in New York.—At the public auction rooms in New York there were no sales of electric railway securities this week.

Acquires Property.—The Milwaukee Electric Railway & Light Company has acquired the electric lighting and power interests of the Honey Creek Electric Light Company.

Mortgage Gold Bonds Being Offered.—Bonbright & Company are offering at 96½ and accrued interest to yield more than 6.25 per cent $1,000,000 of United Light & Railways Company first lien and consolidated mortgage gold bonds known as Series "A" 6 per cent. The bonds are dated April 1, 1922, and are due April 1, 1952.

Utilities Consolidate.—The stockholders of the Central Illinois Public Service Company, a subsidiary of the Midvale West Utilities, in a special meeting held at Springfield voted for the resolution to consolidate the Middle West Power Company and other corporations with the Central Public Service Company, etc. At the same time a meeting in Chicago of the stockholders of the Middle West Power Company, another Middle West subsidiary, voted for the resolution to consolidate.

Reorganization Postponed.—Another postponement in the proposed reorganization of the Pittsburgh Railway has been recently announced. With the permission of the Pennsylvania Public Service Commission, the date for carrying out the proposed reorganization has been set for Oct. 15. There had recently been a postponement until Sept. 1. The postponement was granted on the petition of the Philadelphia Company, which is undertaking the reorganization. It was agreed to by the city of Pittsburgh, which is a party to the proposed railways reorganization plan.

Gold Bonds Offered.—A syndicate including Dillon, Read & Company, New York, is offering at 98½ and interest, to yield more than 6.10 per cent, $10,000,000 of the 6 per cent refunding and first mortgage gold bonds, series C, of the Milwaukee Electric Railway & Light Company. The bonds are dated June 1, 1921, and are due Sept. 1, 1953. The purpose of the issue is to retire $3,600,000 of five-year 7 per cent notes due in November and to reimburse the corporation for expenditures for additions to the property. The bonds are secured by a first lien on the company's property.

On the Way to Resuming Service.—The name of the Bryan College Interurban Railway, Bryan, Tex., has been changed to the Bryan Traction Company. The stockholders of the company recently met for the purpose of organization. Work will very shortly get under way looking toward the resumption of operation. The following board of directors was elected: F. C. Bolton, James Sullivan, W. Wipprecht, E. H. Edge, J. M. Gordon, John M. Lawrence, J. Webb Howell, E. H. Astin and George Chance. The directors met and elected officers as follows: E. H. Edge, president; E. H. Astin, vice-president; James Sullivan, secretary, and J. M. Gordon, treasurer. Todd A. White has been selected manager of the property.

Long Island Line May Resume Service.—Following a conference at which were present representatives of the city, receivers and bondholders of the North Shore Traction Company, Judge Inch announced that he would enter an order directing that the work of dismantling the line be stopped. It is now probable that service on the abandoned lines in Flushing, Whitestone, Bayside, Douglaston and Little Neck will be restored. Judge Inch, in his chambers in the Federal Building, Brooklyn, at the conference on Aug. 23 suggested a plan calling for operation while a special master to be appointed by him would try to reconcile the claims and counter claims of interested parties. Vincent Victory, representing the city at the hearing, said that after a tour of inspection which he had made along the line, he thought service could be started within three weeks.

Traffic and Transportation

Election Rules Jitneys Out of Birmingham

Jitneys were virtually voted out of existence in the city of Birmingham, Ala., by a majority of 6,175 at an initiative election on Aug. 28, when the jitney men's ordinance submitted as a substitute for the city's jitney regulations was defeated overwhelmingly. Canvass of the election returns on Aug. 29 by the Birmingham Election Commission showed that the vote in favor of the jitney men's ordinance was 2,827. The vote against the ordinance was 9,002. The total vote cast was a light one.

As a result jitneys probably will cease operations on Sept. 15 and reductions of cash fares to 7 cents and ticket fares to 6 cents probably will be put into effect by the Birmingham Railway, Light & Power Company immediately after that date. In fact, preparations for taking off the jitneys and reducing car fares are now being made.

At a meeting of the Birmingham Jitney Owners' and Drivers' Association, which obtained the injunction now pending and submitted the ordinance on which the initiative election was held, it was decided to abide by the results of the election and cease operations. The meeting of the association was held on the night of Aug. 29, following the official canvass of the returns. James Weatherly, attorney for the jitney men, advised the city attorney's office of the decision on the morning of Aug. 30 and stated that he would join with the city in asking the Alabama Supreme Court to dissolve the injunction, now in force, on Sept. 15.

J. S. Pevear, co-receiver of the Birmingham Railway, Light & Power Company, stated that a new schedule of rates carrying into effect the reductions will be made up and as soon as the injunction has been dissolved and the city's regulations put into effect the company will ask the approval of the Public Service Commission for the new rates.

Judge W. I. Grubb of the United States District Court, following the election, approved the order for the purchase of twenty new cars, which were contracted for by the company some months ago.

Clause Fixing Ten-Cent Rate in Youngstown Asked

A request that the Council of Youngstown, Ohio, fix fare rate J, providing for a 10-cent fare on the Youngstown Municipal Railway, was made in a letter sent to the Council recently by G. T. Seely, president of the Pennsylvania-Ohio Electric Company.

The request is made, according to Mr. Seely, in accordance with section 14 of the franchise which provides that Council shall fix two higher schedules than the one in effect. Schedule H, providing for an 8-cent fare, is now in effect; Schedule I, providing for a 9-cent fare, is provided for by ordinance of Council, but Schedule J has never been provided for. The Council in 1920 disregarded a similar request. It is said that the present request is merely preparatory in nature, there being no intention of involving the 10-cent rate at present.

The deficit to the stabilizing fund of the railway passed the $1,000,000 mark, the annual report for July showed.

Local Five-Cent Fares Popular on Boston "L"

Many very interesting facts regarding the Boston Elevated Railway were brought out by Edward Dana, manager of the road, at the hearing on wages for the employees, concluded recently. In speaking of the success of the 5-cent fare now in effect, Mr. Dana said that 100,000,000 a year ride on 5-cent lines. The Elevated lost 25,000,000 riders, he said, on these lines when the fare was raised from 8 to 10 cents. The 5-cent riders represent one-fourth of the entire traffic. Their average ride is 1 mile. He said that the universal 5-cent fare formerly in effect was a false economic basis.

The total investment in the Elevated system, Mr. Dana testified, is $143,000,000, of which $52,000,000 represents stock, $46,000,000 bonds and $45,000,000 state and city bonds on the subways and tunnels.

He said that it had taken a number of years to bring wages up to 48 cents an hour, under the old 5-cent fare. Since the establishment of a sound economic basis, the wages have increased from $9,000,000 to more than $15,000,000. The item for wages is now more than the entire operating expenses of the road in 1918.

The depreciation allowance since 1919 has been $2,000.000 a year, whereas it was only $352,000 before public control and the 10-cent fare.

Mr. Dana gave computations as to the number of day's receipts required to pay the various charges in the operations of the system, as follow: 161 days required to meet the payroll; 39 days to pay for the cost of materials, 34.5 days for the return on $52,000,000 of stock; 25 days for interest on bonds, 22 days for fuel; 22 days for interest on state and city funds; 22 days for depreciation, 19 days for Federal, state and municipal taxation; 12½ days to pay back the deficit to cities and towns.

Mr. Dana said that an increase in wages must come out of the amount which ordinarily could be applied toward reducing the 1919 deficit of $5,415.500. If wages should require more than that amount, it would mean an increase in fare temporarily.

United States Supreme Court to Decide Shreveport Fares

The Shreveport Railways is operating under the 7-cent fare as ordered by the court. Three years have passed since the fare agitation started in Shreveport. The matter is still not settled. In 1920, by a vote of the people, the Shreveport Railways was granted an increase in its fare from 5 cents to 6 cents. The election was contested by Huey P. Long, chairman of the Louisiana Railway Commission, acting as a citizen of Shreveport. The State Supreme Court upheld it.

In 1921 the State Constitutional Convention changed the name of the Railroad Commission to the Public Service Commission and gave the Public Service Commission authority to fix rates to be charged by public service utilities. In April, 1922, the Public Service Commission issued an order, without a hearing, fixing the street car fare in Shreveport at 5 cents. After an appraisal of the property had been made by valuation engineers, the Public Service Commission granted a hearing on the application of the company for an increase in fare Jan. 15 and 16, 1923, at which evidence was introduced on both sides on the question. but the commission failed to make a decision. The company appealed to the United States District Court and secured a temporary injunction against the Louisiana Public Service Commission, restraining that body from interfering with the company's collecting a 7-cent fare.

Huey P. Long, chairman of the commission, then sought and was granted an appeal to the United States Supreme Court. He based his appeal on the plea that the Federal District Court was without jurisdiction.

Milwaukee Company Defines Its Use of the Bus

Be not the first by whom the new are tried,
Nor yet the last to lay the old aside.

This advice of Pope the Milwaukee Electric Railway & Light Company has followed. The company is progressive but particular. So that its owners may know, the company inclosed with the dividend check to the holders of its preferred stock accompanying the payment made on Sept. 1 a statement reviewing its affairs. In this statement it contrasted the ten-year growth of the company business from a gross of $7,729,822 in 1912 to $19,493,012 in 1922, a gain of more than 152 per cent. Many other facts were given. The outlook for the future was pronounced to be most promising. On just one matter, the bus, holders of the company's securities are reassured as follows:

> During the past two years your company has added a large fleet of passenger motor buses to its street railway branch. These buses co-operate with the street cars in carrying city passengers, and they supply new travel routes between Milwaukee and scores of cities and towns in the Milwaukee trade territory throughout southeastern Wisconsin.
>
> Your company has always been a leader in inventing or adopting new machinery to get each job done with the fewest necessary men working under humane conditions.

Hyde Park Service Started by Boston Elevated

An arrangement has been completed whereby the Boston Elevated Railway has taken over a part of the Eastern Massachusetts Street Railway system in Hyde Park, a community annexed to Boston some years ago. The Boston Elevated began service over the line on Sept. 1, which has the effect of giving Hyde Park a 10-cent fare to Boston.

The sole purpose of this arrangement was to provide a single fare for Hyde Park, which has fought for it for twenty years. It wanted a 5-cent fare when that was the unit, and its principal reason for seeking annexation to Boston was to obtain the single fare.

In order to accomplish the change the city of Boston acquired a section of the Eastern Massachusetts system and leased it to the Boston Elevated, as it leases the subways and tunnels to the Elevated. Not only does the Elevated run its own cars to the center of Hyde Park, but it has established two lines of buses to other sections of Hyde Park and to Readeville, giving the privilege of transfer from one to the other. The fare unit on the jitneys for the present is 10 cents. So elated are the people of Hyde Park over the change that they had a public celebration on the evening before the new service went into effect and entertained Mayor Curley of Boston, other city officials and the trustees and officers of the Boston Elevated.

Co-operating in Toledo for Safety

Toledo utilities are co-operating in a city-wide campaign for safety. Results already include a new traffic code, plans for a safety week, Sept. 23 to 30, anti-jay-walking campaign, motor drivers' school and a complete industrial and school campaign for the entire year.

The Toledo Safety Council has been organized and is headed by V. J. Waltz, claims attorney for the Community Traction Company, as president. Ray Metzger, manager of the Toledo, Ottawa Beach & Northern Railway, is chairman of the public utility committee. H. E. Brosius has been hired as secretary-manager of the council. He has established offices at 1734 Nicholas Building.

The Toledo Automobile Club has appropriated $5,000 for the printing and distribution of a pamphlet containing the new traffic code, state motor laws and digest of important traffic rules.

May Adopt New P.A.Y.E. Cars in Duluth

As a result of a mild rebellion which has developed among the patrons of the Duluth Street Railway on its West Duluth and Aerial Bridge lines against the use of the turnstile in connection with the pay-as-you-enter-cars, officials of the company in conference with city officials have suggested a way out of the difficulty by abolishing the turnstiles and having a front-end exit.

Herbert Warren, vice-president and general manager of the company, told city commissioners at the conference that the company now desired to make the change and had already made plans to convert ten cars into this type, if the sanction of the City Council could be obtained. An agreement has not yet been reached by the city officials.

For the past week patrons of the line on which the turnstiles have been in operation have taken concerted action in refusing to pass through them. No serious trouble, however, has resulted and the incident has merely served to cause the company officials to confer with the City Council with reference to the adoption of a new type of pay-as-you-enter cars.

Seeks to Use One-Man Cars.—Application has been made to the Wisconsin Railroad Commission by the Wisconsin Public Service Corporation to introduce the one-man car between Kaukauna and Green Bay.

New Rates Filed.—The Pittsburg & Beaver Street Railway, Pittsburgh, has filed a new tariff of rates with the Public Service Commission effective Sept. 17. The tariff increases the fare between Sixth Street, Ambridge, and Station Street, Leetsdale, from 5 cents a round trip to 5 cents each way.

Bible Students Break Pass Records.—During the week ended Aug. 19, the Tacoma Railway & Power Company reached the record total sale of 12,512 dollar weekly passes compared with a sale of 8,400 in the same week (Pass No. 4) of last year. The record was attained through the patronage of 500 delegates to the International Bible Students Association.

Will Protest Bus Competition.—The Levis County Railway, Levis, Que., is protesting against the alleged illegitimate competition of motor buses. A ruling was recently handed down by the Public Service Commission asking the city of Levis to co-operate with the electric railway so as to assure fair returns to that company and to take means, if necessary, to prevent undue competition from auto bus owners.

Interurban to Run Buses.—The Chicago, Ottawa & Peoria Railway, included in the Illinois Traction System, has been authorized by the Illinois Commerce Commission to abandon operation of 3½ miles of track between Hick's Junction and the village of Ladd, contingent upon the company arranging to supply adequate service by bus between Spring Valley and Ladd. It has already agreed to do this.

Must Continue Safety Practice.—Motormen or conductors on the Wisconsin Public Service Corporation line operating between Kaukauna and Green Bay must flag their cars across a number of steam line tracks, according to a ruling of the commission. The steam trains move slowly and are infrequently used, but the commission refused to permit discontinuance of the safety practice.

Authorizes One-Man Cars.—The Missouri Public Service Commission has authorized the use of one-man cars by the Hannibal Railway & Electric Company. A hearing was held on the company's application at Hannibal on Aug. 8. The city officials informed Public Service Commissioner E. J. Kean, who conducted the hearing, that there was no objection to the cars provided they received and discharged passengers on the right side. The order permitting the use of the cars issued on Aug. 14 makes this requirement.

Wants More Cars Operated. — The City Council of Buffalo has asked the Public Service Commission to direct the International Railway to operate more cars and under shorter headway on the local lines in Buffalo. Figures compiled by the municipal authorities indicate that approximately 440 cars, not including interurban cars, are being operated in Buffalo during the rush hours between 4:30 and 6:30 p.m. Two years ago, the figures show, the International was operating 805 cars, with 925 in 1921 and more than 1,200 in 1913 and 1914.

Rerouting Plan Rejected. — After a discussion in which neither the Davenport City Council nor Manager R. J. Smith of the Tri-City Railway would agree on the proposed rerouting plan for the city, the Council rejected the plan in toto. Previous to the rejection Manager Smith proposed to introduce two bus feeder lines tapping the districts east and west of Vander Veer Park and to agree to allow the Thirteenth Street-Grand Avenue line to remain as it is now, to extend the Rockingham line to the city limits and to extend the Northwest line from Division Street out to Lombard.

Buses Make Connection.—A new bus line started operation on Aug. 1 which connects southeast and southwest Washington. The line is operated jointly by the Capital Traction Company and the Washington Railway & Electric Company. Two buses are operated, giving a twelve-minute service each way. The fare is 8 cents cash, six tokens for 40 cents, with a 2-cent transfer charge to or from electric railway cars at points where the buses connect with various lines of the Capital Traction Company or of the Washington Railway & Electric Company.

Extends Service.—The United Traction Company, in keeping pace with the development of Albany, which has recently annexed a portion of the town of Colonie, has extended its service over its West City line route a distance of 0.65 mile to the city boundaries, which adds 1.3 miles to the trackage of the traction company. This territory had been served by the interurban cars of the Schenectady Railway and the residents of the section are now given a much better service with the payment of but one regular city fare. The first car was run over the extended route on Aug. 27 and was driven by Mayor Hackett of Albany.

Perfecting Plans for Bus Operation.—Plans are being perfected by the Boston Elevated Railway management under which practically all the trolley lines will be eliminated in Malden, Mass. Motor buses will replace them. Tracks will be ripped up and streets repaved. This action is expected to relieve traffic congestion. A bus terminal will be placed on land owned by the road at Main and Center Streets, from which two-car and three-car trains will be operated from the bus terminal to the Everett terminal of the elevated structure.

Transfer System Changed.—The present system of transfer will be simplified on the lines of the Los Angeles Railway by making it necessary for conductors to carry only two kinds of transfers instead of four. The new plan will be introduced within the next two months. One of the important features of the new plan is that the transfers will have p.m. coupons. Transfers issued in the a.m. period will be torn off the pad, so as to leave the p.m. coupon on the stub. This will eliminate the necessity of carrying a.m. and p.m. transfers. Another feature of the new transfer is that characters will be substituted for dates. In this way fraud can be easily detected.

Bonus for Car Men Under Safety Plan.—Under the safety plan of the Memphis Street Railway, which went into effect two months ago, earnings of platform employees for the month of July totaled $2,721. This brings the total for the two months up to $4,927, or a bonus of $9.36 for each platform man for the two months. The bonus is distributed every three months, and with the first distribution being made in September the bonus for each employee at the present ratio will amount to about $14. The plan was adopted by the company as a measure of safety, the company agreeing with its men to share with them the amount saved by avoiding accidents.

Serving Injunctions on Jitney Operators.—The Schenectady Railway has commenced the service of copies of restraining injunctions on jitney drivers in an effort to drive them off the streets of the city. Service has been had on about forty operators who are summoned to appear in the Supreme Court on Sept. 10 and show cause why they should not be in contempt for failure to abide by the injunction order restraining them from operating. Papers are being prepared for the service of about sixty additional operators. If such procedure does not have the salutary effect desired, the company will proceed to gather evidence against several hundred other operators and serve them as rapidly as possible.

Express Service Provided.—In accordance with the "public be pleased" policy of the Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., passengers on the stations from Ocean Parkway to Parkside Avenue voted, on Aug. 30, to determine the new schedule of trains on the Brighton Beach Line. More than two-thirds of the patrons voted, the figures showing 21,692 votes by 31,919 passengers on the Brighton line. Plan No. 1, which provides for express service from Brighton Beach, by way of Manhattan Bridge, to Forty-second Street, with local service from Coney Island and Brighton Beach, via the Montague Street tunnel, to Fifty-seventh Street won by a plurality of 3,186 votes. The new schedule will go into effect on Oct. 1.

May Class Buses as Public Utilities.—A public hearing will be given by the Massachusetts Department of Public Works on Sept. 12 at Boston on the question of placing jitneys, buses and motor trucks under the provisions of law classifying them as "public utilities." Under such classification they will not be permitted to operate anywhere within the state before the public authorities declare that "public convenience and necessity required" that the specific service be performed. The plan would virtually place the buses and jitneys in the same class with street railways and steam railroads for the purpose of regulation, and the Department of Public Utilities probably would be empowered to regulate fares and schedules.

Book Reviews

Properties of Chilled Iron Car Wheels

Part I—Wheel Fit and Static Load Strains; Bulletin 129.
Part II—Wheel Fit, Static Load and Flange Pressure Strains, Ultimate Strength of Flange; Bulletin 134.
Part III—Strains Due to Brake Application, Co-efficient of Friction and Brake-Shoe Wear; Bulletin 135.
By J. M. Snodgrass, professor of railway mechanical engineering, University of Illinois, and F. H. Guldner, special investigator. Published by the Engineering Experiment Station of the University of Illinois, Urbana, Ill.

These three bulletins of the Engineering Experiment Station of the University of Illinois are the result of a three-year investigation of properties of cast-iron car wheels, made under the direction of the Railway Engineering Department of the University, in collaboration with the Association of Manufacturers of Chilled Iron Car Wheels. Investigation of the strength of wheels has been made with a view toward improving the design and increasing the safety of cast-iron car wheels. Particular attention has been paid to testing the flanges of the wheels, as breakage at this point is extremely serious.

The program adopted by the committee was embraced to determine (1) the strains caused by mounting the wheel on its axle; (2) the strains caused by the static or wheel loads; (3) the ultimate breaking strength of flanges, and strains caused by flange pressure; (4) the strains due to temperature gradients in the wheel caused by brake application; (5) incidental problems related to the above.

Part I deals principally with strains due to mounting the wheel on the axle, while Part II, in addition to giving further information on this subject, covers the effect of different thicknesses of flange on the strength, and also shows the effect of wear on the wheel flanges on their strength. The general conclusion from the results of these tests is that the flange strength of the chilled iron wheel can be increased to keep pace with probable future service requirements by a proper placing of additional metal in the tread and flange.

Part III deals principally with tests of friction and wear of brake-shoes applied to chilled iron wheels and, for comparative purposes, to steel wheels, rotating at constant speed. Temperature changes due to brake-shoe pressure were very carefully determined. The principal conclusion was that the stresses in chilled iron wheels, set up by temperature gradients due to brake application, are transmitted mainly through the outer plate, the strains or stresses on the inner plates being relatively small. The stresses resulting from temperature gradients may be kept within safe limits by the use of cooling periods or cooling stations. The so-called "arch-plate" design gives better service results than the M. C. B. type, due to better placing of the material.

Prolonged and excessively heavy brake application may cause strains of sufficient intensity to crack either chilled iron or steel wheels. This emphasizes the necessity for careful attention to operating conditions of breaking apparatus in both level and mountainous regions.

Proceedings of the Eighteenth Convention of the Union Internationale de Tramways

The report of the proceedings, held in Brussels, Oct. 2-7, 1922, has just appeared in a volume of 482 pages. They contain the papers and discussions, together with a brief account of the social events. The latter are illustrated by views of the places visited.

Explosives, Their Materials, Constitution and Analysis

By C. A. Taylor and Wm. H. Rinkenbach. Bulletin 219, United States Bureau of Mines, Washington, D. C.

This is a comprehensive, well-indexed book of 188 pages, covering in a thorough manner the properties and analysis of materials used in explosives, and full information regarding the explosives themselves. It will be useful to electric railway engineers who are responsible for blasting operations.

Personal Items

Mr. Banghart in New York

Former Augusta-Aiken Official Made Vice-President of Staten Island Properties

Charles S. Banghart has resigned as general manager of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., to accept the position of vice-president of the Staten Island Edison Company and the Richmond Light & Railroad Company, with offices in St. George, Staten Island, New York City. All of these properties are under the management of the J. G. White Management Corporation. Mr. Banghart will be succeeded at Augusta by F. Bayard Culley, who has been assistant secretary and treasurer there. Mr. Culley will in turn be succeeded by M. H. Hendee, commercial manager and purchasing agent at Augusta.

This formal announcement means, of course, that Mr. Banghart is coming back to New York to live. And that means a great deal to Mr. Banghart's many friends in the Metropolitan district. Augusta's expressed regret at losing Mr. Banghart is sincere, but Augusta's loss is indeed New York's gain. Mr. Banghart looms large wherever men gather.

A FACTOR IN PUBLIC AFFAIRS

If ever praise was heaped—yes, heaped, that's the only word—upon a man by the daily press of the city he was about to leave that man is Charlie Banghart. Augusta took Mr. Banghart to itself at once. There is probably no gift within the power of the people of that city to bestow which Mr. Banghart could not have had at a mere hint of desire from him. While Mr. Banghart did enter actively into civic affairs and the social life of the community, business reasons made it necessary for him to decline some of the honors which Augusta in fact sought to bestow upon him. Of the Rotary Club he was one of the most active members. Last year he was tendered the presidency of that organization, but had to decline. The Augusta *Herald* said of Mr. Banghart that he is a technician without pedantry; a street railway manager without enemies; a disciplinarian without harshness; a humorist without cynicism; a leader without egotism, and a man without guile. Praise, indeed, but not too much. So much for the man. Of his work the Augusta *Chronicle* said that "he found the local system in bad condition and has built it up in efficiency and in the esteem of the people and it can be stated without any exaggeration that the Augusta-Aiken Railway & Electric Company is in better standing with the people of the community than in many years, and a large part of this improved esteem is due to Charles S. Banghart."

Mr. Banghart went to Augusta in 1919. He has been engaged in electric railway work since 1892, being connected in turn since that time with the Thomson-Houston Company, the Union Traction Company, Reading, the New York & Queens County Railway and the Binghamton Street Railway. The properties on Staten Island with which he now has become connected are the successors after reorganization of the Richmond Light & Railroad Company. The White interests bought into them some time ago, and under the reorganization the lighting and railroad properties have been segregated. Of all the boroughs of Greater New York the borough of Richmond, in which Staten Island is located, has, on account of its somewhat isolated position, been the last to feel the impetus of the growth of the greater city, but with the prospect of its connection by tunnel with the rest of the city, great expansion appears to be ahead of it in the next few years. The White interests are planning for this, and in the work of rehabilitating the properties there and expanding them Mr. Banghart will undoubtedly be called upon to play a large part under the direction of President J. H. Pardee.

C. S. Banghart

R. L. Rand, formerly vice-president and manager of the Richmond Light & Railroad Company, will continue with the successor company in the capacity of general manager. He has been connected with the properties for a long time.

Mr. Queeney Appointed Assistant to Mr. Mitten

J. A. Queeney, for many years special representative of the railway department of the General Electric Company at Schenectady, has resigned from that concern to accept the position of assistant to T. E. Mitten, chairman of the board of the Philadelphia Rapid Transit Company.

C. S. MacCalla at Youngstown

Made Vice-President and General Manager of Pennsylvania-Ohio Electric Company

C. S. MacCalla has been made vice-president and general manager of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway and other subsidiaries of the Pennsylvania-Ohio System operating city railway lines in and interurban lines between Youngstown and Warren, Ohio, and Sharon and New Castle, Pa. He assumed the duties of these offices on Sept. 1, succeeding Garrett T. Seely.

Mr. MacCalla brings to his new field of activity a wide and varied experience in public utility operation, both in the railway and the light and power divisions of the electrical industry. He was born in Wallingford, Pa., in 1876. Immediately upon leaving Lehigh University, where he was graduated in 1896, Mr. MacCalla began his work with public utilities, spending brief periods in the installation department of the Philadelphia Bell Telephone Company and as a "trouble shooter" for the Edison Electric Light Company, Philadelphia, now the Philadelphia Electric Company. Then followed four years with the Edison Electric Illuminating Company of Brooklyn (Brooklyn Edison Company) successively as draftsman, construction boss and general construction foreman.

Active electric railway experience began in 1901 when Mr. MacCalla joined the foreign department of the General Electric Company as principal assistant engineer in charge of the installation and initial operation of the Sydney, Australia, tramways system for the New South Wales government, the work including the installation of the steam-electric generating plant, substations and railway equipment, the system being the then largest three-phase transmission plant south of the equator.

In 1903 Mr. MacCalla went to the Pacific Coast, where he was identified with the Washington Water Power Company, Spokane, Wash., for fifteen years, successively as assistant to the general manager, assistant general manager, general manager and vice-president and general manager, continuing in the last named position for five years, and having full charge of operations, both power and railway, in Spokane and some thirty-odd smaller cities and towns within a radius of 100 miles. He equipped the Spokane city railways with one-man Birney safety cars, the installation being the first in any city of more than 100,000 population.

Returning to the east, Mr. MacCalla was elected vice-president and general manager of the Virginian Power Company, Charleston, W. Va., which position he recently resigned.

During his residence in West Virginia he was appointed by the Governor to the state board for registration of engineers and as a delegate to represent the State at the water power conference in New York in February, 1922.

Mr. MacCalla is a member of the American Society of Civil Engineers and a fellow of the American Institute of Electrical Engineers, being active in both organizations.

G. T. Seely Resigns from Youngstown Companies

Garrett T. Seely has resigned as vice-president and general manager of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway, Youngstown, Ohio. Mr. Seely succeeded Richard T. Sullivan with the properties at Youngstown in 1919. Previous to that time he was assistant general manager of the several elevated railways in Chicago. Coming from work in the steam railway field, his first connection in electric railway work was as engineer maintenance of way of the South Side Elevated Railroad, Chicago. He was subsequently advanced to the position of vice-president and general manager of this company. When the four elevated railways in Chicago were consolidated in 1911 as to operation and management he was made assistant general manager of the combined system. He remained in this capacity until 1919, when he went to Youngstown.

Mr. Seely was graduated from the University of Illinois in civil engineering in 1899. At the meeting of the American Electric Railway Association last fall Mr. Seely was elected president of the Transportation & Traffic Association. He has always been active and interested in sectional and national association work and previous to his election as president of the Traffic Association held important offices in the Illinois Electric Railway Association, the Central Electric Railway Association and National Electric Light Association. He has been one of the most progressive among railway men in adopting the bus as an additional transportation tool, and also in devising ways of better merchandising of the transportation services.

New Manager Named at Augusta

F. Bayard Culley, assistant secretary and treasurer of the Augusta-Aiken Railway & Electric Corporation, has been appointed general manager of the company to succeed Charles S. Banghart, appointed to the Staten Island Electric Company, as noted elsewhere in this issue. Mr. Culley is an Augustan. He has been with the Augusta-Aiken since 1907, and has won promotion after promotion until he has now earned a position which places him in charge of the property. He has worked in the closest touch with Mr. Banghart and is particularly well qualified to take over the general managership. Mr. Culley is a Virginian by birth and lived for a while in South Carolina, but Augusta has been his home for many years.

N. H. Brown at Alliance

Former Buffalo Executive Made General Manager of Stark Electric Railroad

Nelson H. Brown has been appointed general manager of the Stark Electric Railroad, Alliance, Ohio, a high-speed line operating between Canton and Salem, Ohio. Prior to accepting appointment to the company at Alliance, Mr. Brown was general manager of the Buffalo & Lackawanna Traction Company and the general manager of the Depew & Lancaster Railway Corporation, Buffalo, N. Y., for two and a half years.

After many years of service in steam and electric railway work, including connections with the New York Central Railroad, the Syracuse Rapid Transit Railway, the Worcester Consolidated Street Railway and the Albany Southern Railroad, among others, Mr. Brown in January, 1913, accepted the position of assistant superintendent of transportation of the International Railway, Buffalo, N. Y., realizing the broader field of opportunity which the position with that company opened to him. On June 1 of the same year he was promoted to the position of superintendent of transportation of the Buffalo Division, and in November, 1915, was made general superintendent of the company.

N. H. Brown

In 1917 Mr. Brown was transferred from the position of superintendent of transportation at Buffalo to that of manager of the electric railway properties of the New Orleans Railway & Light Company, both of which were then subsidiaries of the United Gas & Electric Corporation. He returned to Buffalo from New Orleans in the spring of 1921 and became general manager of the Buffalo & Lackawanna Traction Company and the Depew & Lancaster Railway Corporation.

H. W. Witherspoon, general manager of the Stark Electric Railroad, Alliance, Ohio, has resigned to enter business for himself in Alliance. Mr. Witherspoon will terminate five years of active service with the railway. He was general superintendent for two years and general manager for a year and a half.

John T. Boifeuillet, Macon, Ga., has been elected vice-chairman of the Georgia Public Service Commission to succeed James A. Perry, who had served as vice-chairman of the commission for some time. Mr. Perry was deposed by the other members due to his activities before the recent session of the Georgia State Legislature, in which he advocated reduction of the commission from five to three members.

Malcolm H. Hendee has been appointed to succeed F. Bayard Culley as assistant secretary and treasurer of the Augusta-Aiken Railway & Electric Company. He is a Georgian, and came to Augusta when a very young man. He went with the Augusta-Aiken in 1908 as a stenographer. Recently he has been the commercial manager for the organization, having worked his way up step by step.

Granville Lyon, formerly connected with the securities department of the Wisconsin Power, Light & Heat Company, Madison, has been appointed manager of the newly formed utilities securities department of the Eastern Wisconsin Electric Company, Fond du Lac. He will have charge of this branch of the business in the state of Wisconsin, as well as being head of the new department.

Donald R. Keith, formerly of Lima, Ohio, has been placed in charge of the Springfield, Ohio, office of the department of public relations of the Indiana, Columbus & Eastern Traction Company, according to an announcement on Sept. 3. The appointment follows the transfer recently of Arthur V. Bland, director of the department, and his aids to Columbus. Mr. Keith will represent the department in Springfield and also will supply publicity for his district to the newspapers. M. W. Henney, who was temporarily in charge of the Springfield office, has been transferred to Dayton, where he will represent the department.

Obituary

Andrew B. Shelton, conductor on the Denver Tramway lines for more than thirty-three years, died recently after a brief illness. "Pop" Shelton, as he was affectionately called, came to Denver in 1874. He was one of the first employees of the old cable system.

Harold Wayne Arnold, who had been with the Arnold Company, engineers and constructors of Chicago, for the last seven years, died on Aug. 3 after an illness of five weeks. He was some time ago a salesman with the Sprague Electric Company and also served in that capacity with the Western Electric Company. Mr. Arnold was a native of Nebraska, but went to Arkansas in 1894, where he entered the electrical business. He was a brother of Col. Bion J. Arnold. He was forty-nine years of age.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Weekly Soft Coal Output Sets Record for Year

The week ended Aug. 25 showed the largest production of soft coal for any week during the present calendar year, according to reports of the United States Geological Survey. The total for the week is estimated at 11,346,000 net tons, which is an increase of 503,000 tons over the figure for the preceding week. Early returns on car loading for the week Aug. 28 to Sept. 1 indicate a further increase, with a probable total of about 11,500,000 net tons.

Bituminous production for the first 201 working days of 1923 was 357,036,000 net tons. This total is almost identical with production in 1917 and is exceeded only by that of the year 1918, which was one of abnormal activity owing to the war. Figures for the years 1919, 1920, 1921 and 1922 all fall far below those of production for the current year.

BITUMINOUS STORAGE INCREASED

Soft coal continued to flow into storage during July, and on Aug. 1 commercial consumers had on hand approximately 51,000,000 net tons. In comparison with the figure for the first of the preceding month, this was an increase of 5,000,000 tons. Progress in the building up of stock from the low point reached on Sept. 1, 1922, owing to draft on reserve during the strike last summer, has been practically uninterrupted, and in the eleven months that have elapsed there has been a net gain of 29,000,000 tons. Stocks on Aug. 1 of this year were 10,000,000 tons in excess of those on hand a year ago. Available records show that the supply in storage on Aug. 1 this year has been exceeded only during the period at the close of the war and just prior to the miners' strike of 1922.

Measured in terms of tons, stocks increased 10.9 per cent during July. Measured in terms of days supply the increase was 18.9 per cent. The larger increase in days supply was due to the fact that the rate of consumption decreased in July, thereby increasing the length of time the tonnage on hand would last. At the rate of consumption in July, the stocks on hand Aug. 1 were sufficient to last forty-four days on the average. This average is based on the assumption that stocks were evenly divided, and as such is never the case, the figure has value only for general comparison.

Stocks are far above the average in some communities and far below in others. New England is well supplied, having over ninety days supply on hand. The Eastern seaboard generally is in good shape, the supply of bituminous on hand being sufficient for from sixty to ninety days. About the same condition prevails in the Northwest. In the Central and Southwestern states the conditions are not so good. Stocks in those regions vary from a sixty days supply down to almost nothing.

HARD COAL STOCKS LOW AT PRESENT TIME

Anthracite stocks, on the other hand, are in very poor shape. Throughout New England and the Middle Atlantic states the retailers' stocks of hard coal on Aug. 1, 1923, ranged from 25 per cent to 50 per cent below those on hand Aug. 1, 1921, the last normal year. Conditions in the Central states were somewhat better, but in no case is any large surplus on hand. Retail dealers generally received more anthracite in July than they delivered and their total stocks on Aug. 1 were 4 per cent larger than on the first of the preceding month. These stocks, however, were much lower than during the summer of preceding years, largely because of the rapidity with which coal has been taken by the consumers. The production of anthracite in the week ended Aug. 25 established the year's high record for weekly output. The total for the week ended Sept. 1 will probably be much reduced because the collieries were shut down on Saturday and production slowed up on Friday in anticipation of the present suspension.

Fuel Oil Has Limited Possibilities as Substitute for Coal

As a result of periodic labor troubles in the mine fields and consequent coal shortages, many consumers have been tempted to replace coal burning furnaces by oil-burning apparatus. According to some oil refineries, however, this step should not be taken without careful consideration. It is likely that the economies now possible by the use of fuel oil will not continue to be possible for a period much longer than five years.

It is pointed out that the crude oil supply in the United States is strictly limited, the amount yet available being estimated at about 9,000,000,000 bbl. Of this amount 5,000,000,000 may be classed as being actually in sight and the other 4,000,000,000 bbl. as a possibility. A survey by geologists indicates that there are three principal sources of petroleum in the United States and gives the approximate quantity to be expected from each. It is thought that there are in the Gulf Coast region, including the states of Texas and Louisiana, about 2,100,000 bbl. The California oil fields should yield about 1,850,000 bbl. according to their estimate, and those in Oklahoma 1,340,000 bbl. The remainder of the 9,000,000,000 is distributed in numerous states with no very large concentration at any one point. Since the publication of the report, additional wells have been discovered in California and it now appears probable that a greater supply than was estimated will be available there.

The ordinary life of a flowing well is said to be about two years. Pumping may add one year more to the life of a well but will likewise add very considerably to the cost of the oil. It is expected that the California oil fields will be able to maintain their present output for about eighteen months more. A large production may be expected from the wells in Oklahoma and the Gulf Coast states for about two years more. The output of crude petroleum after the expiration of that time will depend largely upon the opening up of new fields in the future.

The total production of oil in the United States at the present time is not quite 500,000,000 bbl. annually. The consumption, however, is well over 500,000,000 bbl. Under these circumstances, with the total supply limited, it is evident that present low prices and abundant production will not continue indefinitely. There is, however, a possibility that the development of South American oil fields will balance the decreasing supply in the United States. At the same time refiners point out that methods of extraction are being constantly improved and there remains less residue for fuel oil. On this account any hasty decision to replace coal burning furnaces by oil-burning furnaces would seem to be unwise.

Copper Price Declines

Recent quotations give a price of copper in small quantities as low as 13⅞ cents per pound. This is a reduction of more than 2 cents per pound from the price prevailing a number of weeks ago. At this figure manufacturers say copper is selling below the actual cost of production. The particular occasion for this decline appears to be a further slackening in the foreign demand.

Metal, Coal and Material Prices

Metals—New York	Sept. 4, 1923
Copper, electrolytic, cents per lb.	13.687
Copper wire base, cents per lb.	16.50
Lead, cents per lb.	6.80
Zinc, cents per lb.	6.82
Tin, Straits, cents per lb.	41.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.125
Somerset mine run, Boston, net tons	2.50
Pittsburgh mine run, Pittsburgh, net tons	2.30
Franklin, Ill., screenings, Chicago, net tons	1.80
Central, Ill., screenings, Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.00
Weatherproof wire base, N. Y., cents per lb.	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.91
White lead, in oil (100-lb. keg), N. Y., cents per lb.	11.375
Turpentine, (bbl. lots), N. Y., per gal.	$0.95

Track and Line

Muskegon Traction & Lighting Company has been granted permission to extend its Ottawa Street car line to Getty Avenue.

Memphis Street Railway will extend the Florida Street line 900 ft. south of the present terminus to the point intersected by the Horn Lake Road.

Toronto, Ont.—The City Council has sanctioned the payment of $5,000,000 to the Toronto Transportation Commission for the program of rehabilitation of the street railway system for 1923.

Niagara, St. Catharines & Toronto Railway has planned improvements throughout the Niagara peninsula calling for an expenditure of $2,300,000. Of this amount it is estimated about $300,000 will be used for the building of a new terminal in St. Catharines.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C., will soon start work on putting in a single track on King Street between Line and Cleveland, taking the place of the present double track. The old rails will be taken up and new ones laid.

Southern Public Utilities Company, Charlotte, N. C., will construct an extension of the West Highlands line to the new city high school. The work will be pushed to completion so that the greater facilities thus presented may be supplied to the pupils in the coming session.

Tennessee Electric Power Company, Chattanooga, Tenn., is making extensive improvements to its system in the Chattanooga district. A double-track section is being laid on East Fourteenth Street and work will soon be started laying new tracks on Central Avenue, West Ninth Street and on Chestnut to Main.

Indiana Service Corporation, Fort Wayne, will receive a franchise for the laying of a double car line on Lafayette Street from Lewis Street to Wallace Street. A petition for the franchise has been under advisement since it was presented to the board some months ago. The laying of tracks on Lafayette Street will give the company another line into the southern part of the city and will eliminate some of the congestion on Calhoun Street. Under the agreement, the company agrees to bear some of the expense of constructing the subway at Lafayette Street.

San Francisco-Oakland Terminal Railways, Oakland, Cal., has just finished rebuilding a double track on North Grove Street, in Berkeley, from Berkeley Way to Hopkins Street, a distance of 4,802 ft. The cost was $92,000. The company is now engaged in one of the most expensive pieces of double-track reconstruction it has ever undertaken. The work is being done on Telegraph Avenue, from Fifty-Second Street, in Oakland, to Dwight Way, in Berkeley, a total distance of 9,733 ft. The Oakland portion of the job will cost $127,700 and the Berkeley portion $87,200.

United Railways, St. Louis, through Receiver Wells, has been authorized to spend $1,218,806 during the balance of 1923 for construction, reconstruction, repairs and maintenance of the company's properties. For buildings and alterations in shops and substations, $212,000; for substation equipment, $161,450; for bridge construction $10,000 has been set aside. Earlier in the year Judge Faris authorized expenditures totaling $1,628,455, the total for the entire year being $2,847,261. For street paving and trackwork $1,366,480 has been allotted. Most of this will be spent for reconstructing tracks.

Power Houses, Shops and Buildings

Illinois Power & Light Company, Chicago, Ill., will construct a power plant on Lake Decatur to cost $5,000,000.

Eastern Wisconsin Electric Company, Sheboygan, Wis., will construct a freight depot at the local carhouse in Fond du Lac. This will take care of service demands on account of the establishment of through interurban passenger and freight service connecting Fond du Lac, Milwaukee and Green Bay.

Wisconsin Public Service Corporation, Green Bay, Wis., has purchased the Davies Falls waterpower site on the Pike River south of Amberg, where the company proposes to add and erect another hydro-electric plant to its rapidly growing hydro-electric generation business. This company has just completed construction work on its Johnson Falls hydro-electric plant and is now actively engaged in developing another plant at Caldron Falls.

Springfield Traction Company, Springfield, Mo., is increasing the size of its carhouse by the erection of a brick and structural steel addition 81 ft. wide by 78 ft. 6 in. This addition is necessary to take care of cars and buses operated by the company. The building is being constructed by Sanderson & Porter, who are doing considerable other work in the city, and will be completed about Oct. 1. The entire cost of the addition will be in the neighborhood of $30,000.

Trade Notes

Hoggson & Pettis Manufacturing Company, New Haven, Conn., has acquired by purchase the assets, good will and business of the Sterling-Meaker Company. It is prepared to furnish repair parts and accessories as well as registers of this make to electric railways in the market for this type of equipment.

Uehling Instrument Company, Paterson, N. J., combustion engineers and manufacturers of steam power plant economy apparatus, including CO_2 recorders, has appointed three new Southern representatives, namely, Connor-Hudson Company, Southwestern Life Building, Dallas; Gibbens & Gordon, Inc., 532 Canal Street, New Orleans, and the Cornell Mathews Company, 10 Oak Street, Orlando, Fla. These new representatives are fully equipped to give the personal service demanded by the growing business in the Gulf States.

American Railways Equipment Company, Dayton, will locate its new plant in Springfield if citizens of that city will subscribe at least $30,000 in stock. Representatives of the company made this statement on Aug. 25 while in Springfield in an effort to interest local organizations in the proposition. The company manufactures a new type of street car fare and transfer device, demonstration of which was given before members of the Springfield Chamber of Commerce, street railway men and others recently. The machine, in one operation, distributes the money, totals the fares and issues transfers.

New Advertising Literature

Bates Expanded Steel Truss Company, Chicago, has issued a forty-nine-page pamphlet on its steel poles. The pamphlet is mainly illustrations, with some descriptive matter accompanying each picture.

Johns Pratt Company, Hartford, Conn., has just issued two attractive folders, one describing its "Noark" meter service switch for single-phase and direct-current service; the other emphasizing safety features of "Noark" fuses.

Reliance Electric & Engineering Company, Cleveland, has issued a new bulletin, No. 1014, descriptive of type "AS" Reliance adjustable speed motors of the armature shifting design. The booklet contains twenty-four pages and is illustrated.

Metal & Thermit Corporation, New York, N. Y., has issued a new Thermit rail welding pamphlet, which brings up to date the whole subject of Thermit rail welding to cover the many recent improvements in economy and efficiency. The pamphlet includes detailed instructions, accompanied by illustrations and drawings, showing steps in making the improved Thermit rail weld which has greatly reduced the cost per joint. Improved apparatus used in connection with Thermit rail welding, such as the self-luting mold box and the new lightweight double-burner preheater, which have greatly accelerated the speed of operation, is described in detail for the first time, as well as illustrations showing results of a ten years' service test of the Thermit rail weld, also rail bending and drop tests. Instructions for using Thermit for welding compromise joints, constructing frogs and crossings and repairing loose arms of mates and switches have also been included in complete form. At the end of the pamphlet is a discussion of the theory of rail joints.

PEACOCK

Choosing an investment

How do you pick a bond or other security in which to invest your own personal capital? You consider, do you not, first of all its safety, and next, the return it will pay. These factors must be right, before you trust your money in the enterprise.

Hand Brake Equipment

considered on a similar basis

Safety first is the prime requisite of any braking equipment. If it isn't a safe brake, it isn't worth putting on. You wouldn't risk your money in an unsecure investment. Would you entrust your passengers to unsafe equipment? Of course not! Peacock Brakes are safe—proven so by years of experience on the cars of leading railways—proven so by repeated tests by prominent railway engineers. They're safest because they are designed to yield the highest possible braking force in the shortest possible time.

Return on the investment is highest where Peacock Brakes are used because they practically pay for themselves in a short while through maintenance savings. In every way, Peacock Brakes are an investment of A-1 rating.

National Brake Co., Inc.
890 Ellicott Square, Buffalo, N. Y.
Canadian Representative:
Lyman Tube & Supply Company, Limited, Montreal, Canada

BRAKES

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Business Established 1894
115 BROADWAY, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

THE J. G. WHITE ENGINEERING CORPORATION
Engineers—Constructors
Industrial Plants, Buildings, Steam Power Plants, Water Powers, Gas Plants, Steam and Electric Railroads, Transmission Systems
43 Exchange Place, New York

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
NEW YORK BOSTON CHICAGO

JOHN A. BEELER
Operating, Traction and Traffic Investigations
Routing Surveys—Valuations—Operation Management
52 Vanderbilt Ave., NEW YORK

SANDERSON & PORTER
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals, Reports, Rates, Service Investigation, Studies on Financial and Physical Rehabilitation Reorganization, Operation, Management
683 Atlantic Ave., Boston, Mass.

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

J. ROWLAND BIBBINS
Engineer—921 Fifteenth St., WASHINGTON, D. C.
TRANSPORTATION
Complete Transit Surveys and Development Programs, adapting Motor-Transport, R.R. Terminal and City Plans. Traffic, Service, Routing, Operation and Valuation. EXPERIENCE IN 20 CITIES

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS—APPRAISALS—RATES—OPERATION—SERVICE

JOE R. ONG
Consulting Transportation Engineer
Specializing in Traffic Problems and in Methods to Improve Service and Increase Efficiency of Operation
PIQUA, OHIO

Dwight P. Robinson & Company
Incorporated
Design and Construction of
Electric Railways, Shops, Power Stations
125 East 46th Street, New York
Chicago Youngstown Montreal
Philadelphia Los Angeles Rio de Janeiro

Parsons, Klapp, Brinckerhoff & Douglas
WM. BARCLAY PARSONS H. M. BRINKERHOFF
EUGENE KLAPP W. J. DOUGLAS
Engineers—Constructors—Managers
Hydro-electric Railway Light and Industrial Plants
Appraisals and Reports
CLEVELAND NEW YORK
1570 Henna Bldg. 84 Pine St.

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

DAY & ZIMMERMANN, INC.
ENGINEERS
Design, Construction
Reports, Valuations, Management
NEW YORK PHILADELPHIA CHICAGO

WALTER JACKSON
Consultant on Fares, Buses, Motor Trucks
Originator of unlimited ride, transferable weekly pass. Campaigns handled to make it a success.
143 Crary Ave., Mt. Vernon, N. Y.

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING, 71 BROADWAY, NEW YORK

Manufacturers of Steel Structures of all classes, particularly

BRIDGES AND BUILDINGS

Sales Offices:

NEW YORK, N. Y.	*71 Broadway*
Philadelphia, Pa.	*Widener Building*
Boston, Mass.	*120 Franklin Street*
Baltimore, Md.	*Continental Building*
PITTSBURGH, PA.	*Frick Building*
Cincinnati, Ohio	*Union Trust Building*
Cleveland, Ohio	*Guardian Building*
Detroit, Mich.	*Beecher Ave. & M. C. R. R.*
CHICAGO, ILL.	*208 South La Salle Street*
St. Louis, Mo.	*Liberty Central Trust Bldg.*
Denver, Colo.	*First National Bank Bldg.*
Salt Lake City, Utah	*Walker Bank Building*
Duluth, Minn.	*Wolvin Building*
Minneapolis, Minn.	*7th Ave. & 2d St., S.E.*

Pacific Coast Representative:
U. S. Steel Products Co., Pacific Coast Dept.

San Francisco, Cal.	*Rialto Building*
Portland, Ore.	*Selling Building*
Seattle, Wash.	*4th Ave. So., Cor. Conn. St.*

Export Representative: United States Steel Products Co., 30 Church St., N. Y.

EDWIN WORTHAM, E.E.

Consulting Engineer

Valuations of Electric Railways and Utilities of All Kinds

Traffic and Operating Studies

Allison Bldg. Richmond, Va.

Established Feb. 1913.

ANDREW SANGSTER & COMPANY

Consulting Accountants

New York and Chicago

Rate Investigations Consolidations
Depreciation Studies Reports to Bankers

25 Broadway, New York

STEVENS & WOOD, INC.

Design and Construction of Power Stations
Railroad Electrification, Industrial Plants

REPORTS AND APPRAISALS

Management and Financing of Utilities and Industrials

Youngstown New York

Byllesby
Engineering & Management
Corporation

208 S. La Salle Street, Chicago

New York Tacoma

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors SYRACUSE, N. Y.

KELLY, COOKE & COMPANY

Engineers

149 BROADWAY
NEW YORK

424 CHESTNUT STREET
PHILADELPHIA

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

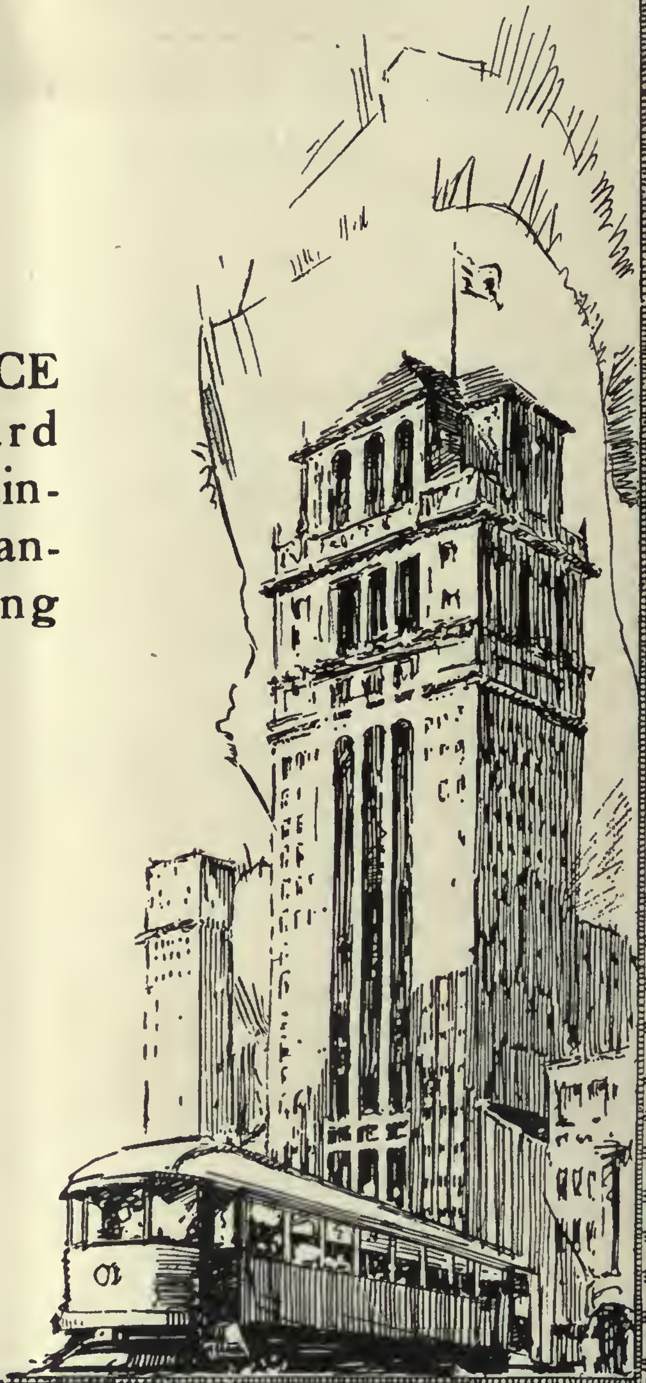
When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

STEEL

'CARNEGIE'

When you think of Steel—think of Carnegie

COLLIER SERVICE sustains car card space value by maintaining a nation-wide organization of car advertising experts.



CANDLER BUILDING, THE HOME OF COLLIER SERVICE.

Barron G. Collier
INCORPORATED
CANDLER BLDG NEW YORK

Type AT-R Arc Weld Bond

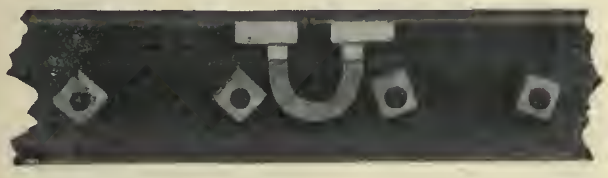
Round steel bar terminals, Easy welding, High conductivity

Rail Bonding satisfaction easily achieved

ERICO Rail Bonds satisfy every desirable rail bonding requirement. The many types, lengths and capacities enable you to choose a bond just suited to your conditions.

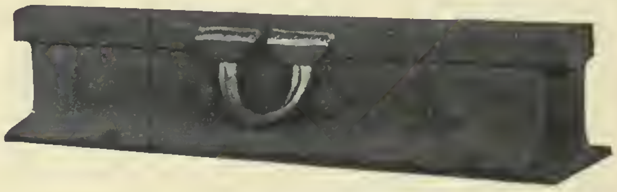
For extended bonding the ERICO Brazed Bond cannot be surpassed. Cheap installed cost, long life and the highest conductivity possible make this bond the standard among big electric railways. Brazed Bonds can be applied on head of rail, or web of rail, with ease and certainty of results.

For "pickup" bonding, where the distance between bond applications is long, the ERICO Arc Weld Bonds will render efficient service at a very moderate installed cost.



Type ET Brazed Bond

For application to the head of rail of 60 lbs. to the yard or over.



Type AT-F Arc Weld Bond

With heavy forged terminals electricity brazed to the copper

Take advantage of our 18 years' experience in solving your rail bonding problems.

The Electric Railway Improvement Co.

Cleveland, Ohio

ERICO RAIL BONDS

"It's BOYERIZED"

For the long pull
and the strong pull;
the short pull,
and the sharp pull—

BOYERIZE!

A buzz—a slight hiss of air—and the great car comes to a smooth stop. Or a sudden jerk at the air control, and she stops almost instantly, with a grind and a jar.

In any case the strain on the brake rigging is terrific. Only specially hardened steel can live at all—only Boyerized steel with its glossy armor plate surface can give full service and protection.

You may smile, but experience has proved that it outwears case-hardened steel *three to four times.*

The McArthur Turnbuckle

You won't have to re-fit the brake rigging with new turn-buckles, if you specify McArthur Turnbuckles in the first place. They will last as long as the truck itself.

More than that—the old-style jam-nut idea has been scrapped, and an efficient spring-equipped split-clamp principle has been substituted. Now it only takes a pocket-wrench and a moment's time to make an adjustment, and tighten it up *to stay.*

Other Boyerized Products Include

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings

Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates

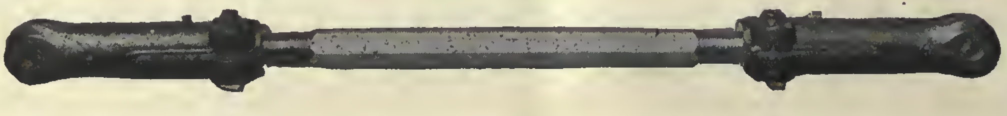
McArthur Turnbuckles
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

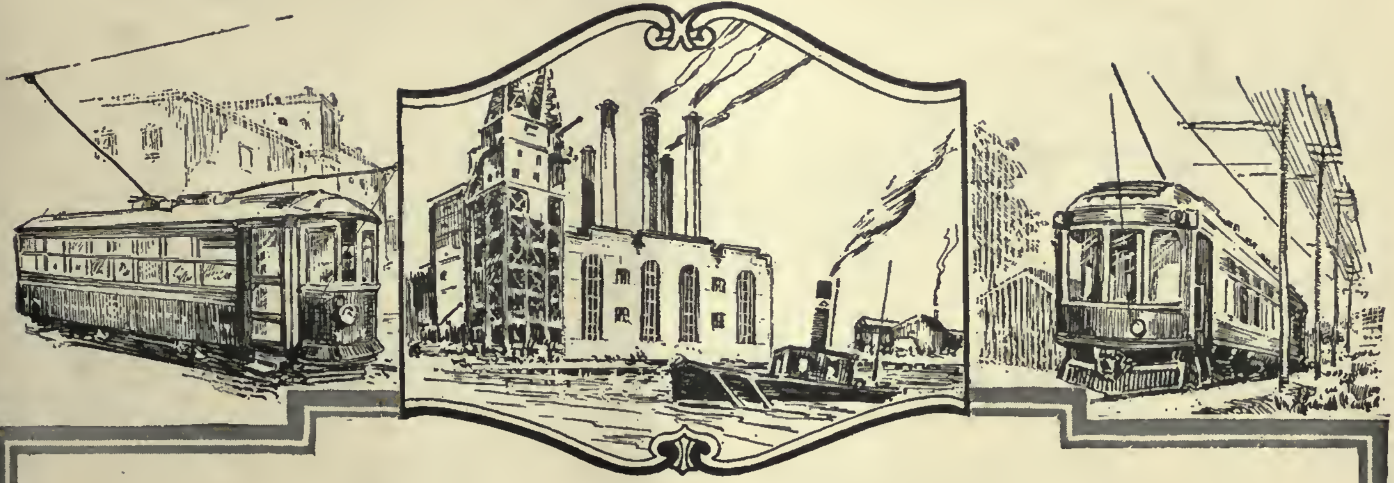
Bemis Car Truck Company, Springfield, Mass.

Electric Railway Supplies

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Oregon
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.





WILL THE SUB-STATION PASS OUT?

SOME day an electrical genius might develop a method whereby electrical power will be generated at a huge power station and then sent by radio to all sorts of vehicles.

Then, in that "dim and distant Future" feed-wires will be unnecessary and the Sub-station will pass out.

But right now we have sub-stations with us. They are the "Middle Man" in the great business of power transmission. And it costs money to keep them going.

How much it costs depends on

1—Maintenance Cost.

2—The extent of power losses.

3—The efficiency of the human element, namely,—Attendance.

We know that by co-operation with you we can save something for you on all three of these items. And this is why we think we can save you money:

A—Good lubrication—the right Texaco Lubricant in the right place, in the right amount will preserve bearings, lengthen the life of equipment—*reduce maintenance.*

B—It is equally patent that reduced friction, through correct lubrication saves power—(another way of saying) *reduces power losses.*

C—When lubrication is exactly what it should be, there is no running around to cool off heated bearings. A thousand and one little troubles are headed off and we stand ready to lay out a lubricating schedule which will simplify the work—all of which means *reduced attendance.*

All Texaco Engineers are trained to co-operate with mechanical executives and, when necessary, to assist subordinates to become thoroughly familiar with the quantities and brands of Texaco Lubricants for the units they handle.

The Sub-station is only one department where we can show economies through scientific lubrication and Texaco co-operation. Many important street railway properties have cut their operating costs through the use of Texaco Service and Texaco Lubricants all down the line—in power plant and sub-stations, on rolling stock or in the shops.

TEXACO T

THE TEXAS COMPANY

DEPT. R.J. 17 BATTERY PLACE . NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES

Ready for you!

August, 1923, Edition

McGRAW
Electric Railway Directory

with NEW FEATURES

New Listing of Holding Companies
(cross indexed)

New indexing to show what lines connect any cities or towns in which you are likely to be interested.

New data regarding number of buses owned.

List of bus lines controlled by electric railways.

plus

1. A complete list showing the correct name of every recorded electric railway company in the United States, Canada, Mexico and the West Indies, arranged by States and Cities.
2. Address of each company.
3. Names of affiliated and controlling corporations.
4. Names of principal communities on routes.
5. Names and addresses of corporation officers and principal department heads, including purchasing agents.
6. Names and addresses of holding or controlling companies and lists of properties controlled by each.
7. Names and addresses of consulting engineers, if any.
8. Addresses of power plants and repair shops.
9. Number and make of generators, starting capacity, voltage, whether d.c. or a.c., and if a.c., phase and cycles.
10. If water power is used, horsepower and make of prime movers.
11. If steam power is used, horsepower and make of boilers and engines.
12. If gas or oil engines are used, horsepower and make.
13. Transmission voltage.
14. Trolley voltage.
15. If energy is purchased, from whom.
16. Number and capacity of sub-stations, number of rotary converters and motor generator sets used.
17. Amusement parks reached, whether owned or controlled by company.
18. Mileage of the road, owned, leased and trackage rights.
19. Miles in paved streets.
20. Gage of track.
21. Number and kind of rolling stock used.

*22. Number of one-man cars.

*23. Rate of fares.

24. Doing a lighting business.
25. Date of latest information.
26. Names, officers and executive committees of Electrical Railway Associations, arranged alphabetically by name.
27. Names, commissioners and principal assistants of National and State Railroad and Public Utility Commissions, arranged alphabetically by States.
28. Statistics showing growth of the industry.
29. Alphabetical list of Electric Railway Officials, indexed for company connections.
30. Alphabetical index to companies.

*New in this issue.

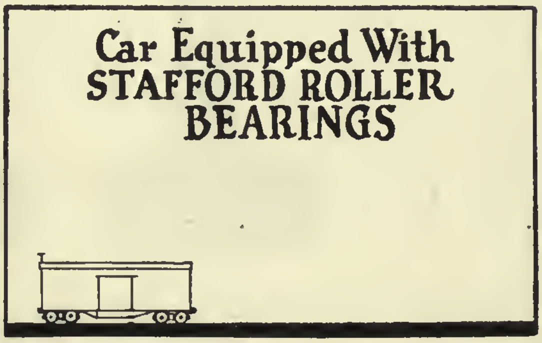
No change in price

$5.00 per copy. $9.00 per year for two successive semi-annual issues. Order now.

Directory Department

McGRAW-HILL COMPANY, INC.
Tenth Avenue at 36th Street, New York

Running Uphill on Level Track



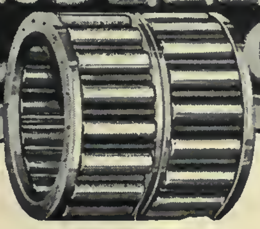
Actual tests show that friction journal bearings are equivalent in their dragging effect to a +0.2% grade—or more.

It is easy to figure the additional power which is required in overcoming this friction in every trip every car makes over your line.

Stafford Roller Bearings reduce car journal friction 90%, which means the equivalent of reducing the road gradient at least 0.2%.

Stafford Roller Bearings—guaranteed three years.

STAFFORD ROLLER BEARING
CAR TRUCK CORPORATION
LAWTON MICHIGAN



"IT ROLLS THE FRICTION AWAY"

The COLUMBIA Armature Stand

The Columbia Armature Stand is a patented stand with a ten-inch height adjustment. It protects the equipment and because of its square thread screws, is easy for the workmen to handle.

The roller bearings are in cradles and there are pockets for table irons.

It can also be adapted to many shaft repair jobs about the shop, and will be found useful in other ways.

If your shop is not equipped with an adjustable armature stand, you will find it worth while to investigate the Columbia Adjustable Armature Stand.

NOTE—Our telephone number has been changed to Applegate 3200-1-2.

COLUMBIA 1892 MACHINE WORKS

3313 ATLANTIC AVE., BROOKLYN, N. Y.

Bates Steel Poles

Will

Help

Sell

Your Securities

Use Bates Steel Poles with your other first-class equipment and the whole installation will be permanent and an inducement for your security buyers.

Bates Pole installations are easily maintained. All surfaces are exterior, therefore are quickly and cheaply painted. Bates Pole prices are surprisingly low.

Bates Expanded Steel Truss Co.

ILLINOIS MERCHANTS BANK BLDG.
CHICAGO, ILL.

Have you your Bates Treatise on Steel Poles?

BATES ONE PIECE EXPANDED STEEL POLES

PRACTICALLY all gears make a good showing in their advertising but the real story of comparative quality is found in their service records. Nuttall BP gears have made many, many records which have never been equalled.

Ask the man who uses them.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1923

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

EVERY GEAR REGISTERED

Nuttall

Nkwe

A Kaffir kid (nkwe) doesn't dare talk back to his elders.

The rule is to knock him unconscious if he does.

No slapping wrists in that country.

And it's pretty nearly right—for half-way measures rarely get one anywhere—especially in brush application. That's why Morganite combines engineering with sales. Thus when motor troubles are encountered, the engineer stays with it until the machine doesn't talk back.

In the parlance of the ring, Morganite service is a "knockout."

Morganite Brush Co., Inc.

Main Office and Factory:
519 West 38th St., New York
DISTRICT ENGINEERS AND AGENTS
Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Bldg.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Bldg.
Buffalo, Electrical Engineering & Mfg. Co., 409 Lafayette Bldg.
Philadelphia, Electric Power Equipment Corp., 412 North 18th St.
Baltimore, O. T. Hall, Sales Engineer, 1926 Edmondson Ave.
Revere, Mass., J. F. Drummey, 75 Pleasant Street
Los Angeles, Special Service Sales Co., 502 Delta Bldg.
San Francisco, Special Service Sales Co., 202 Russ Bldg.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 131 Eastern Ave.

Is Money Ever "Spent" for Advertising?

A young and energetic executive took hold of a fine old business in New York.

"What this business needs," he told himself, "is a place in the mind of the public."

And deliberately he set out to sacrifice the greater volume of his profits and invest the sacrifice into the building of good will.

He did. And to this old business, advertising was the breath of life.

For six months had not passed before the business had grown so that the advertising cost was a smaller percentage than ever it had been, and, because of a larger volume, the shop effected economies and gave far superior service.

That was five years ago. Today a certain percentage is spent, or supposed to be spent, for advertising. But as fast as the appropriation is spent, the more the business increases; and the more that the business increases, the smaller the percentage becomes.

Is money ever "spent" for advertising?

Published by the Electric Railway Journal in co-operation with The American Association of Advertising Agencies.

The Universal Safety Car

Larger Capacity—Lower Expenses

A fifteen-ton, 54-seat, safety car, equipped for one-man or two-man operation. Separate entrance and exit doors at each end, both ends controlled at the brake handle. All the standard interlocking safety devices are provided.

Here is a car for operating economy and maintenance economy. Its standardized construction means lower costs.

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"

Specifications

General Dimensions

Length over all	42 ft. 5½ in.
Length over vestibule sheathing	41 ft. 2½ in.
Width over all	8 ft. 4⅞ in.
From rail to top of floor	2 ft. 7¼ in.
From rail to top of roof	10 ft. ¾ in.
Truck centers	21 ft.

Trucks

St. Louis Car Co. Am. 64 Type with chrome nickel steel heat-treated arch bars. Wheelbase 5 ft. 4 in.; wheels 26 in. diam.: journals 3¼ in. x 6 in.

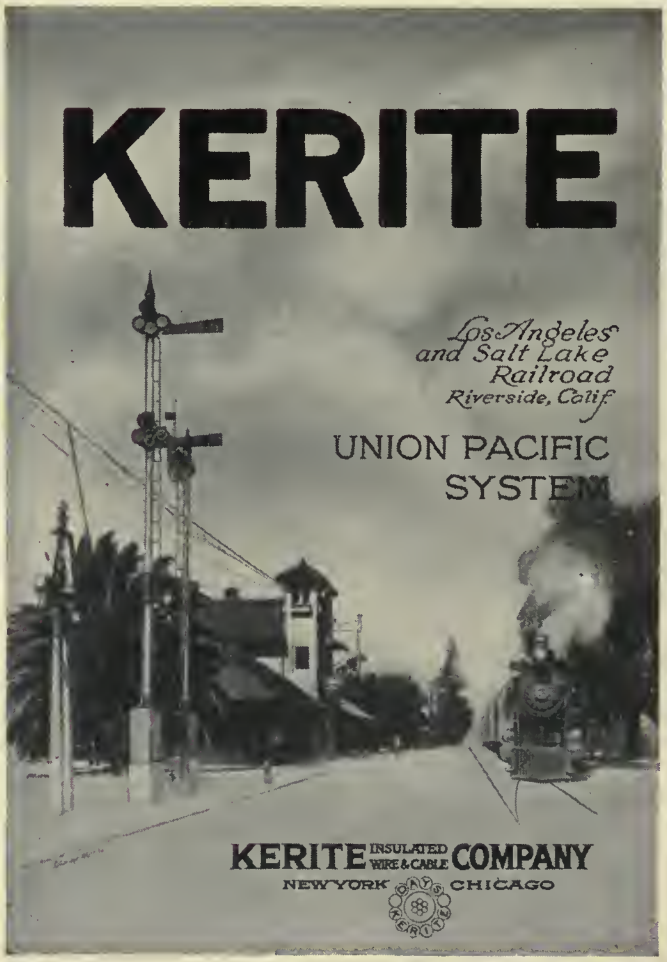
Griffin Wheel Company
McCormick Building
Chicago, Ill.

GRIFFIN
F. C. S.
WHEELS

For Street and Interurban
Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma



AMERICAN ELECTRICAL WORKS AMELECTRIC WIRES and CABLES PHILLIPSDALE, R.I.
Reg. U. S. Pat. Office
Incandescent Lamp Cord

AMELECTRIC PRODUCTS
BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.
Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg; New York, Pershing Sq. Bldg.

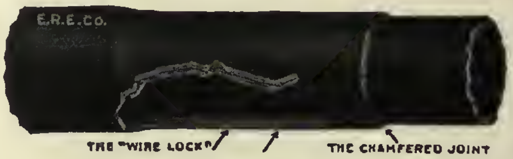
International Creosoting & Construction Co.
Galveston, Texas
Plant—Texarkana Beaumont Galveston
MONEY SAVERS TO RAILWAYS
Treated railway ties, poles, piling, bridge timbers, etc.
See our full page advertisement in last week's issue.

DUNDEE "A" AND "B" FRICTION TAPES

are Okonite Products
'Nuff Said!

Write for Samples and Circulars
THE OKONITE CO., Passaic, N. J.
Incorporated 1884
Sales Offices: New York—Atlanta—San Francisco
Agents: Central Electric Co., Chicago, Ill.; Pettingell-Andrews Co., Boston, Mass.; The F. D. Lawrence Electric Co., Cincinnati, Ohio; Novelty Electric Co., Philadelphia, Pa.
OKONITE TRADE MARK REG.U.S.PAT.OFFICE

ELRECO TUBULAR POLES



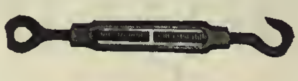
COMBINE
Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability
Catalog complete with engineering data sent on request
ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
NewYork City, 30 Church Street

Shaw Lightning Arresters
Standard in the Electric Industries for 35 years
Henry M. Shaw
150 Coit St., Irvington, Newark, N. J.

AETNA INSULATION LINE MATERIAL
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches
Albert & J. M. Anderson Mfg. Co.
289-93 A Street Boston, Mass.
Established 1877
Branches—New York, 135 B'way
Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St.
London, E. C. 4, 38-39 Upper Thames St.

AUTOMATIC SIGNALS
Highway Crossing Bells
Headway Recorders
NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.

HUBBARD TURNBUCKLES
Drop Forged to insure reliability and strength.
Double Hot Galvanized to preserve that strength.



Type B, Eye and Hook
HUBBARD & COMPANY
PITTSBURGH CHICAGO

U. S. ELECTRIC AUTOMATIC SIGNAL
for single track block signal protection
United States Electric Signal Co.
West Newton, Mass.

Chapman
Automatic Signals
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INSULATED WIRES AND CABLES
JOHN A. ROEBLING'S SONS CO., TRENTON, NEW JERSEY

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Conway Building, Chicago, Ill.
THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Conn.

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CROWN
UNITED STATES
TWIN TERMINAL
SOLDER
TRIPLEX

Arc Weld and Flame Weld

*Send for new
Rail Bond Book*

American Steel & Wire Company
CHICAGO
NEW YORK

The Baker
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CREOSOTERS

Washington Court House, Ohio

Cross Ties Bridge Timbers
Lumber Posts
Piling

Treated and Untreated

We solicit your inquiries

**Creosoting Plant located
Washington Court House, Ohio
On—Penna. R.R., B. & O. R.R., D. T. & I. R.R.
Operating Mills in Southern Ohio**

BARBOUR-STOCKWELL CO.

**205 Broadway, Cambridgeport, Mass.
Established 1858**

Manufacturers of

Special Work for Street Railways

**Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings**

ESTIMATES PROMPTLY FURNISHED

WHARTON

Special Trackwork

For Street and Steam Railways

Steel Castings Gas Cylinders

ORIGINATORS OF
Manganese Steel Trackwork

WM. WHARTON JR. & CO., Inc.

Easton, Pa.

Other Plants:

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Tioga Steel & Iron Co., Philadelphia, Pa.
Philadelphia Roll & Machine Co., Philadelphia, Pa.

SPECIALISTS

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Design and Manufacture

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***Standard—Insulated—and
Compromise Rail Joints***

**The Rail Joint Company
61 Broadway, New York City**

Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

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Sales Offices:
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United States Steel Products Company
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Builders since 1868 of Water Tube Boilers of continuing reliability

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HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

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Bayonne, N. J.
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Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

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DENVER, 435 Seventeenth Street
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SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, PORTO RICO, Royal Bank Building

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A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.
Cleveland, Ohio

The Differential Car

An automatic dump car, an electric locomotive, a snow plow, and a freight car—all in one. Big savings shown in track construction and maintenance, paving work, coal hauling, ash disposal, snow removal, and freight transportation.

The Differential Steel Car Co.
Findlay, Ohio

Heywood-Wakefield
CAR SEATS
of pressed Steel for all Classes of Passenger Service. Rattan for covering seats and for snow sweepers.
HEYWOOD-WAKEFIELD CO.
Factory at Wakefield, Mass.
Offices at New York, Chicago, San Francisco

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition

"Make it of Vul-Cot Fibre"

NATIONAL VULCANIZED FIBRE CO.
WILMINGTON DELAWARE

Lapp Insulators
Lapp Insulator Co. Inc. LeRoy, N.Y.
Trade Mark

ALLIS-CHALMERS
MILWAUKEE, WIS. U. S. A.

Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes

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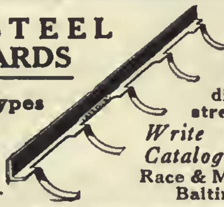
Adapted to all types of rails and paving.

W. S. GODWIN CO., Inc.



Proven by service to economically prevent seepage and disintegration of street railway paving.
Write for Illustrated Catalog No. 20.
Race & McComas Sts.,
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RAMAPO AJAX CORPORATION

Ramapo Automatic Return Switch Stands for Passing Sidings

RACOR
TRADE MARK

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GENERAL OFFICES: HILLBURN, NEW YORK
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Manufacturers of
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Insulated Wire of all kinds
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Cable Terminals, Junction Boxes, etc.

Boston, Washington, Philadelphia, Pittsburgh, Seattle, Chicago, New York, Atlanta, San Francisco, Detroit, Los Angeles, St. Louis

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Suitable types for any kind of railway car or motor bus.

Neat
Light
Strong
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Steel Seat Light Weight

It will pay you to consider Hale & Kilburn Seats for your new cars on the basis of (1) Passenger comfort, (2) Attractive appearance, (3) Lower maintenance.

Let us submit quotations

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Works: PHILADELPHIA

NEW YORK, 30 Church St.
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ST. LOUIS, Theresa and Clark Aves.
ATLANTA, Candler Bldg.
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Ohmer Indicating and Recording Fare Registers

are especially well adapted for use in one-man cars, either for city or interurban service.

The operation is quick and snappy. Each fare is clearly indicated and a correct printed record made of it.

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OHMER FARE REGISTER CO.
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always

Fit the Fare and Fare Collection System

The Cleveland Fare Box Co.
Cleveland, Ohio

Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

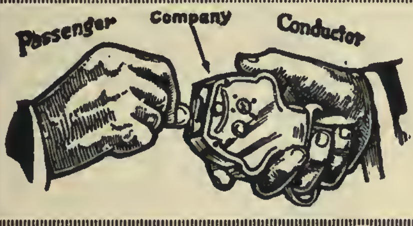
Type R-10

International Registers

Made in various types and sizes to meet the requirements of service on street and city system. Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
15 South Throop Street, Chicago, Illinois



Direct Automatic Registration By the Passengers

Rooke Automatic Register Co.
Providence, R. I.

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off

Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

PS HEATERS

Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED

No. 478E

GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

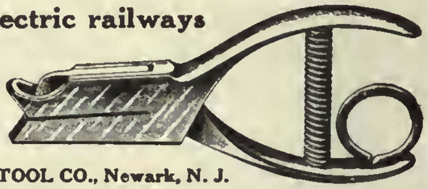
T. S. Q

Says

"I save equipment

Expense."

Tool Steel Quality



75% of the electric railways

use

B-V Punches

Send for Catalog

BONNEY-VEHSLAGE TOOL CO., Newark, N. J.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

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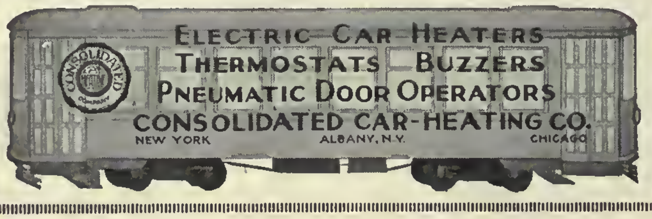
Sells Transportation

Let our experts on railway car finishing demonstrate Beckwith Chandler paints and varnishes. Write for details.

Beckwith-Chandler Co., 203 Emmett St., Newark, N. J.



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THERMOSTATS BUZZERS

PNEUMATIC DOOR OPERATORS

CONSOLIDATED CAR-HEATING CO.

NEW YORK ALBANY, N.Y. CHICAGO

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W. C. Lincoln, Manager Sales and Engineering

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Pittsburgh Forge & Iron Co.'s Products
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Genesco Paint Oils
Turnstile Car Corporation—Turnstiles
Economy Electric Devices Co.
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Fort Pitt Spring & Mfg. Co., Springs
C-H Electric Heaters
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E-Z Car Control Corp. Safety Devices
Llod Aluminum Field Coils
Flaxlinum Insulation
National Safety Car Equipment Co.'s One-Man Safety Cars
Anderson Slack Adjusters

Advertisements for the

Searchlight Section

Can be received at the New York Office of Electric Railway Journal until 10 a. m.

Wednesday

For issue out Saturday

0220

BUCKEYE JACKS

High-grade R. R. Track and Car Jacks

The Buckeye Jack Mfg. Co.

Alliance, Ohio

MOORE RAPID **'LECTROMELT** FURNACES

MAKE YOUR OWN STEEL AND IRON CASTINGS WHEN AND AS YOU NEED THEM

PITTSBURGH ELECTRIC FURNACE CORPORATION

Largest Maker of Arc Furnaces in the World

PITTSBURGH, PA.

RAILWAY UTILITY COMPANY

Sole Manufacturers

"HONEYCOMB" AND "ROUND JET" VENTILATORS for Monitor and Arch Roof Cars, and all classes of buildings. also ELECTRIC THERMOMETER CONTROL of Car Temperatures.

141-151 West 22d St.
Chicago, Ill.

Write for Catalogue

1328 Broadway
New York, N. Y.

N-L VENTILATORS

Write for new catalogue
"Superior Ventilation"

THE NICHOLS-LINTERN COMPANY

7960 Lorain Ave., Cleveland, Ohio.
N-L Products manufactured and sold in Canada by
Railway and Power Engineering Corporation, Ltd.
133 Eastern Avenue, Toronto, Ontario

SEARCHLIGHT SECTION

EMPLOYMENT-BUSINESS OPPORTUNITIES-EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E. R. J.

POSITIONS VACANT

CHIEF inspector, interurban and city, man who has had lots of experience handling the public and who knows how to take care of trouble on the road. P-601, Electric Railway Journal, Leader-News Bldg., Cleveland, Ohio.

STOCK clerk wanted familiar with storekeeping methods for a street railway company operating small property in New York City. Make application in own hand writing to P-598, Elec. Railway Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

AN executive of broad experience in dealing with the public and city officials, and who has successfully managed a good sized city property for a number of years, will be open for engagement after September 1st and would like to communicate with owners of property that requires building up, with a view of taking charge of same. If interested address Care A. N. J. Smith, Box 202, Newmarket, New Hampshire.

CLAIM agent, 15 years' experience with big street railway company, desire's to change position. Can take full charge of claim department PW-599, Elec. Railway Journal, 10th Ave. at 36th St., New York.

MR. MANAGER, are you in the field for a superintendent of transportation? If so, you should realize that practical experience is an important factor in the successful handling of this department. The writer of this ad has a proven successful record of nineteen years on city, suburban and interurban properties and can furnish high grade references as to character and ability to get results on any property regardless of size or condition of same; at present with large property; personal reasons for making a change. PW-595, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MANAGER or superintendent of railway, light and power properties, technical education, successful organizer tactful in public relations and very resourceful in rehabilitating properties, excellent references. PW-596, Elec. Railway Journal, 10th Ave. at 36th St., New York.

SUPERINTENDENT of equipment or master mechanic; twenty-three years' experience on city and interurban properties; have handled construction on transmission lines, substations, power plants, track and trolley work; available any time. PW-594, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MASTER mechanic wants position, 18 years' experience rebuilding and maintenance cars, armature winding. Best reference. PW-593, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

"Opportunity" Advertising:

Think "*SEARCHLIGHT*" First!

0099

FOR SALE

50-Ton Electric LOCOMOTIVE

600 Volt—D. C.

Locomotives are complete in every respect and are in excellent condition.

Full Specifications Upon Request

Hydro Salvage Syndicate

Niagara Falls—Ontario

Good Relaying Rails

Are as Serviceable as New Rails, with a Big Saving on the Price

We have ready for prompt shipment First-Class Relaying Rails in various weights. Get in touch with us, stating what weight rail and tonnage desired, and we will submit quotations.

HYMAN-MICHAELS COMPANY

531 Peoples Gas Bldg., Chicago

OFFICES AND PLANTS AT

St. Louis, Mo.
Detroit, Mich.
Pittsburgh, Pa.
1324 Woolworth Bldg., New York City.
San Francisco, Cal.
McKees Rocks, Pa.

FOR SALE

26 K-34 Controllers

TRANSIT EQUIPMENT COMPANY

Cars—Motors

501 Fifth Avenue, New York

FOR SALE

20—Peter Witt Cars

Weight Complete, 33,000 lbs.

Seat 53. 4—G. E. No. 258-C Motors. K-12-H Control. West. Air Taylor Trucks. R.H. Type. Complete.

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

1—500-kw. Crocker-Wheeler **Generator**, direct connected to C. & G. Cooper Heavy Duty Cross Compound Condensing Engine, 20x38x36 in., 135 r.p.m.

1—14x22x24-in. Blake-Knowles Single Horizontal **Jet Condenser.**

1—5x12-in. Outside Packed Plunger, Cameron Boiler Feed **Pump.**

2—Aultman & Taylor Water Tube **Boilers**, 280 hp., 126—4-in. Tubes, 18 ft. long, 2—36-in.x20-ft. Drums, 160 lbs. pressure.

Hartford & Springfield St. Ry. Co.

Warehouse Point, Conn.

Some One Wants to Buy

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

The Searchlight Section is Helping Others

—Let It Help You Also

0212

24-G

A Ten Dollar Bill—

for every man, woman and child in the country

More than a billion dollars—ten dollars for every person in the United States—has been saved the Government since 1919 when the Director of Sales Office began to liquidate the War Department's enormous stocks of surplus property.

The American business man little stops to ponder that this might have been paid by him in tax premiums for "victory insurance" in the world war.

Many plans for the disposal of this surplus were suggested in 1918—from throwing all of it into the sea to dumping it all on the market at once at the best prices then obtainable.

The War Department, however, established and has held to a very definite policy—safe, sane and in keeping with the interest of business and industry as well as in the interest of the individual tax payer and citizen.

That policy has been the gradual liquidation of surplus over a term of years, the rapidity of such liquidation being governed by the ability of the markets to absorb the various commodities offered, without undue disturbance of trade.

The last of the war surplus is in sight. Much of what remains on hand is high grade withdrawals made for a contemplated large standing army.

If American business men will take the trouble to investigate these remaining opportunities and make a serious effort to participate in this worthwhile enterprise many more millions in taxes will be spared.

The Way to Investigate

Watch your Commercial Business Publication and the Metropolitan Dailies for announcements of specific auction or sealed bid sales.

Send for the Catalog mentioned in the announcement.

Check off the items that interest you.

Send a representative to the sale to inspect the materials—in advance, if possible.

To ensure you more leeway, send your name and address at once to Major J. L. Frink, Chief, Sales Promotion Section, Room 2515, Munitions Building, Washington, D. C. Advise him the character of materials you are interested in, and if such items are available in future sales your name will be placed on the War Department mailing list and catalogs of such sales forwarded you as rapidly as sales are scheduled.

Final commodity sales will begin in September and continue until liquidation of stocks is completed at the Quartermaster Depots in Brooklyn, Chicago, San Antonio and San Francisco. Offerings include a wide range of Quartermaster Supplies, Ordnance Property and smaller quantities of Engineer Property, Chemical Warfare and Medical and Hospital Supplies.

Important sales of Real Estate, Buildings, Plants and Warehouses will be held at Camp Devens, Ayer, Mass.; Ordnance Reserve Depot, Amatol, N. J.; Ordnance Reserve Depot, Toledo, O.; Camp Knox, Louisville, Ky.; and Camp Lewis, American Lake, Wash. Definite dates will be announced later.

Look for the Eagle before you shop.

WAR DEPARTMENT

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
- Collier, Inc., Barron G.

Air Receivers, Aftercoolers
- Ingersoll-Rand Co.

Anchors, Guy
- Elec. Service Supplies Co.
- Ohio Brass Co.
- Standard Steel Works Co.
- Westinghouse E. & M. Co.

Armature Shop Tools
- Elec. Service Supplies Co.

Automatic Return Switch Stands
- Ramapo Ajax Corp.

Automatic Safety Switch Stands
- Ramapo Ajax Corp.

Axles
- Bemis Car Truck Co.

Axles, Car Wheel
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Carnegie Steel Co.
- Westinghouse E. & M. Co.

Axle Straighteners
- Columbia M. W. & M. I. Co.

Batteries, Dry
- National Carbon Co.

Babbitting Devices
- Columbia M. W. & M. I. Co.

Badges and Buttons
- Elec. Service Supplies Co.
- Internat'l Register Co., The

Barges, Steel
- American Bridge Co.

Bearings an Bearing Metals
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Gilbert & Sons. B. F. A.
- Westinghouse E. & M. Co.

Bearings Center and Roller Side
- Stucki Co., A.

Bells and Gongs
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- Consolidated Car-Heating Co.
- Elec. Service Supplies Co.

Boilers
- Babcock & Wilcox Co.

Bonding Apparatus
- American Steel & Wire Co.
- Elec. Service Supplies Co.
- Ohio Brass Co.
- Railway Track-Work Co.

Bonds, Rail
- American Steel & Wire Co.
- Elec. Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- Railway Track-Work Co.
- Westinghouse E. & M Co

Brackets and Cross Arms (See also Poles, Ties Posts, etc.)
- Bates Exp. Steel & Tr Co
- Elec. Ry. Equipment Co.
- Elec. Ry. Improvement Co.
- Elec. Service Supplies Co.
- Hubbard & Co.
- Ohio Brass Co.

Brake Adjusters
- National Ry. Appliance Co.
- Westinghouse Tr. Br. Co.

Brake Shoes
- Amer. Br. Shoe & Fdry. Co.
- Barbour-Stockwell Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.

Brakes, Brake Systems and Brake Parts
- Ackley Brake & Supply Corp.
- Allis-Chalmers Mfg. Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- National Brake Co.
- Westinghouse Tr. Br. Co.

Bridges, Steel
- American Bridge Co.

Brushes, Carbon
- General Electric Co.
- Jeandron, W. J.
- Le Carbone Co.
- Morganite Brush Co.
- National Carbon Co.
- U. S. Graphite Co.
- Westinghouse E. & M. Co.

Brushes, Graphite
- Morganite Brush Co.
- National Carbon Co.
- U. S Graphite Co.

Brush Holders
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.

Brushes, Wire Pneumatic
- Ingersoll-Rand Co.

Buildings, Steel
- American Bridge Co.

Buses, Motor
- Brill Co., The J. G.

Bushings
- National Vulcanized Fibre Co.

Bushings, Case Hardened and Manganese
- Bemis Car Truck Co.
- Brill Co., The J. G.

Cables (See Wires and Cables)

ambric, Tapes, Yellow and Black Varnished
- Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes Carbon)

Car Lighting Fixtures
- Elec. Service Supplies Co.

Car Panel Safety Switches
- Consolidated Car Heating Co.
- Westinghouse E. & M. Co.

Cars, Dump
- Differential Steel Car Co.
- St. Louis Car Co.

Cars, Passenger, Freight Express, etc.
- Amer. Car Co.
- Brill Co., The J. G.
- Kuhlman Car Co., G. C.
- McGuire-Cummings Mfg. Co.
- National Ry. Appliance Co.
- St. Louis Car Co.
- Wason Mfg. Co.

Cars, Second Hand
- Electric Equipment Co.

Cars, Self-Propelled
- General Electric Co.

Castings, Brass, Composition or Copper
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.

Castings, Gray Iron and Steel
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.

Castings, Malleable and Brass
- Amer. Brake Shoe & Fdry. Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.

Catchers and Retrievers, Trolley
- Elec. Service Supplies Co.
- Ohio Brass Co.
- Wood Co., Chas. N.

Catenary Construction
- Archbold-Brady Co.

Change Carriers
- Cleveland Fare Box Co.

Circuit Breakers
- General Electric Co.
- Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
- Anderson Mfg. Co., A. & J. M.
- Elec. Ry. Equipment Co.
- Elec. Ry. Improvement Co.
- Elec. Service Supplies Co.
- General Electric Co.
- Hubbard & Co.
- Ohio Brass Co.
- Westinghouse E. & M. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
- Brill Co., The J. G.
- Ohio Brass Co.

Clusters and Sockets
- General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
- Columbia M. W. & M. I. Co.
- Elec. Service Supplies Co.

Coils, Armature and Field
- Columbia M. W. & M. I. Co.
- General Electric Co.

Coils, Choke and Kicking
- General Electric Co.
- Westinghouse E. & M. Co.

Coin-Counting Machines
- Cleveland Fare Box Co.
- Elec. Service Supplies Co.
- Internat'l Register Co., The

Coin Sorting Machines
- Cleveland Fare Box Co.

Coin Wrapping Machines
- Cleveland Fare Box Co.

Commutator Slotters
- Elec. Service Supplies Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Commutator Truing Devices
- General Electric Co.

Commutators or Parts
- Cameron Elec'l Mfg. Co.
- Columbia M. W. & M. I. Co.
- Westinghouse E. & M. Co.

Compressors, Air
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Ingersoll-Rand Co.
- Westinghouse Tr. Br. Co.

Compressors, Air, Portable
- Ingersoll-Rand Co.

Condensers
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Ingersoll-Rand Co.
- Westinghouse E. & M. Co.

Condensor, Papers
- Irvington Varnish & Ins. Co.

Conduits, Flexible
- Alphaduct Co., The

Connectors, Solderless
- Westinghouse E. & M. Co.

Connectors, Trailer Car
- Consolidated Car-Heat'g Co.
- Electric Service Sup. Co.
- Ohio Brass Co.

Controllers or Parts
- Allis-Chalmers Mfg. Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Controller Regulators
- Electric Service Sup. Co.

Controlling Systems
- General Electric Co.
- Westinghouse E. & M. Co.

Converters, Rotary
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- Samson Cordage Works

Cord Connectors and Couplers
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- Samson Cordage Works
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- Ohio Brass Co.
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- Allis-Chalmers Mfg. Co.

Cross Arms (See Brackets)

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Crossing Foundations
- International Steel Tie Co.

Crossing Frog and Switch
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- Wharton, Jr., & Co., Wm.

Crossing, Manganese
- Ramapo Ajax Corp.

Crossings Track (See Track, Special Work)

Crossings, Trolley
- Ohio Brass Co.

Crushers, Rock
- Allis-Chalmers Mfg. Co.

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- Brill Co., The J. G.
- Electric Service Sup. Co.
- Morton Mfg. Co.

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- Electric Equipment Co.
- General Electric Co.

Derailing Devices (See Track Work)

Derailing Switches
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Destination Signs
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- Wish Service, P. Edward

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Draft Rigging (See Couplers)

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Drills, Track
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- Ohio Brass Co.

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- Ramapo Ajax Corp.

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- Wharton, Jr., & Co., Wm.

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- Pittsburgh Elec. Furnace Corp.

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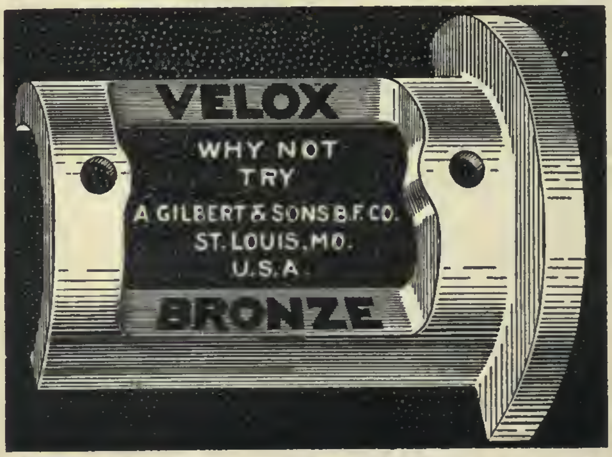

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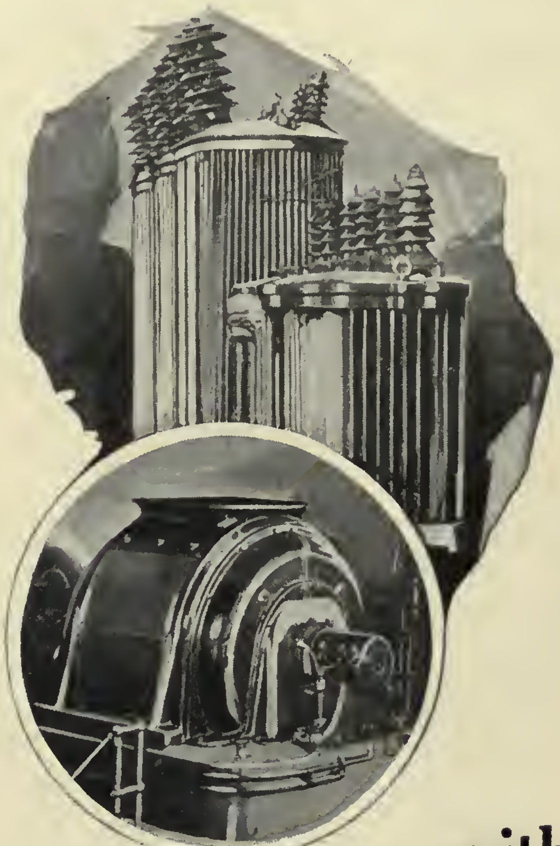
Cut Winding Costs



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In the old type 72-yard roll of sewed bias tape, there is a loss of 63 inches of material by seam cut-outs; a loss of fifteen minutes productive labor; sixty-three open or lumpy splices in the windings; maximum chance for air pockets or loose windings and a maximum requirement of insulating varnish.

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Clapp & Lamoree, Los Angeles
F. G. Scofield, Toronto

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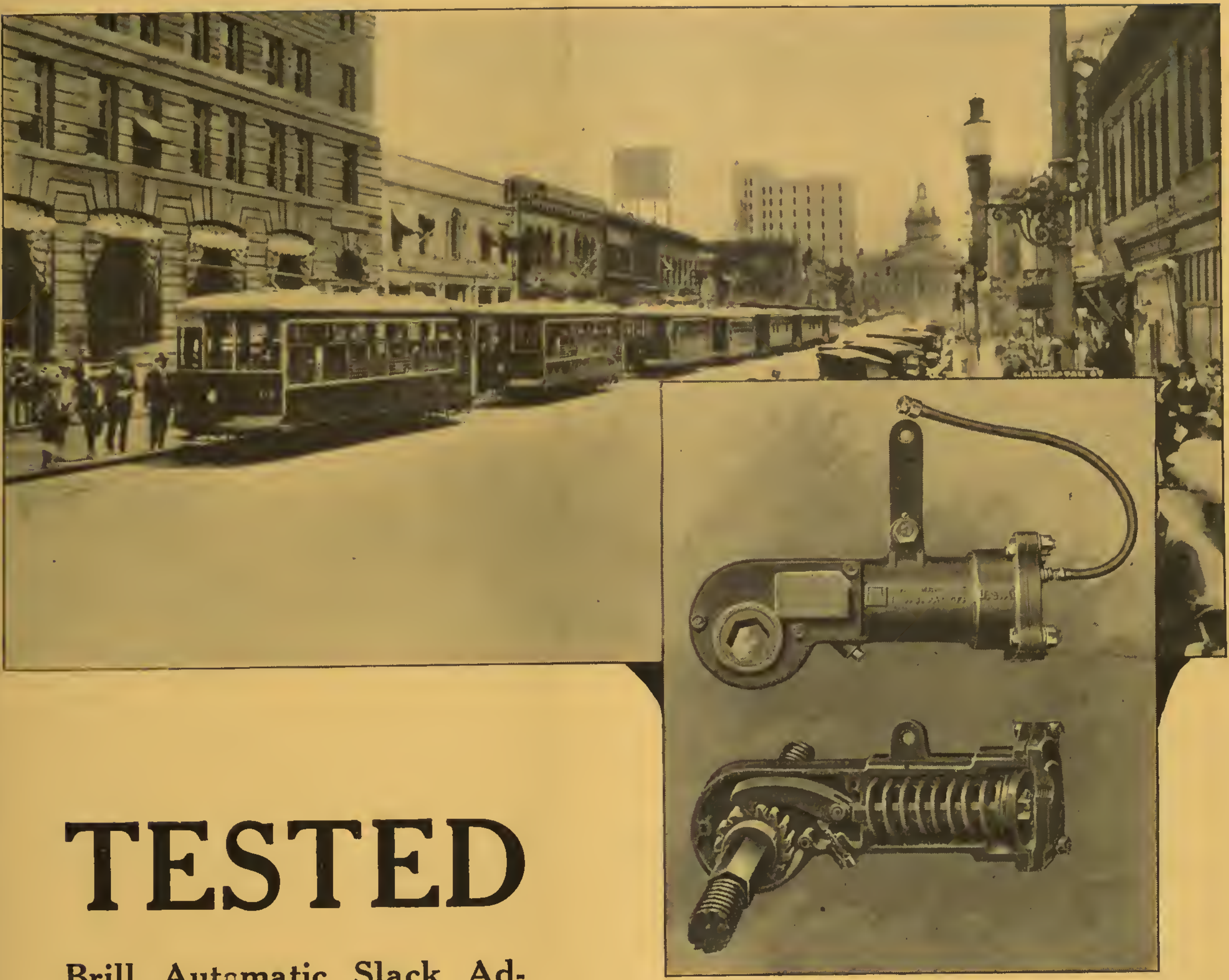

TESTED

Brill Automatic Slack Adjuster for safety cars is demonstrating its efficiency in actual service tests.

This air-operated device was primarily designed to automatically adjust the brakes on safety cars to compensate for wheel and brake shoe wear, and with minimum use of air and maintenance. Tests in actual service are proving it does all it is intended to do.

Railway Companies which first tried out the Brill Automatic Slack Adjuster, and results:

	Number Ordered	
	First Order	Repeat Orders
Arkansas City, Winfield Northern Ry..	1	2
Citizens Traction Company..........	1	6
Connecticut Company	1	1
Jacksonville Traction Co.............	20	7
Madison Railways	1	7
Nashville Ry., Lt. & Pwr. Co.........	1	3
N. C. Public Service Co.............	1	11
Northern Texas Trac. Co.............	1	9
San Antonio Public Service Co.......	1	29
San Diego Elec. Ry.................	1	35
Springfield St. Ry.................	1	20
Tampa Electric Co.................	1	5
United Rys. & Elec. Co.............	1	22
Virginia Ry. & Pwr. Co.............	2	93
Wisconsin Ry. Lt. & Pwr. Co........	1	10

Also adopted as standard equipment by large list of railways without test

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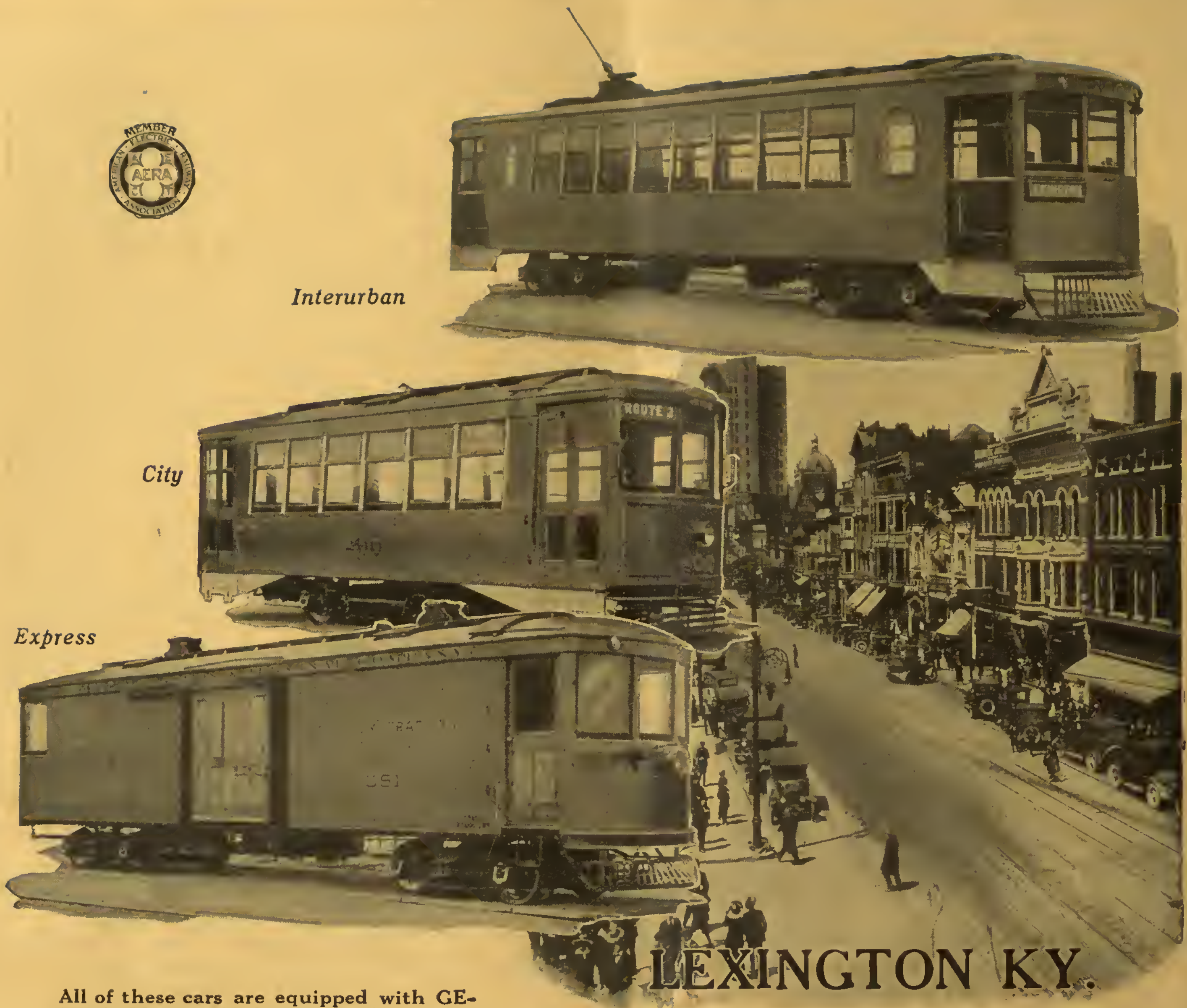

All of these cars are equipped with GE-264-A Motors, K-Control and G-E Air Brakes, the single-truck cars having CP-25 Compressors and the double-truck cars CP-27 Compressors. The advantages of standardization, permitting the use of one type of motor, axle, wheel and other equipment, are obvious.

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The Kentucky Traction & Terminal Company, a combined city and interurban property, has standardized on light-weight equipment and has completely replaced its rolling stock with:

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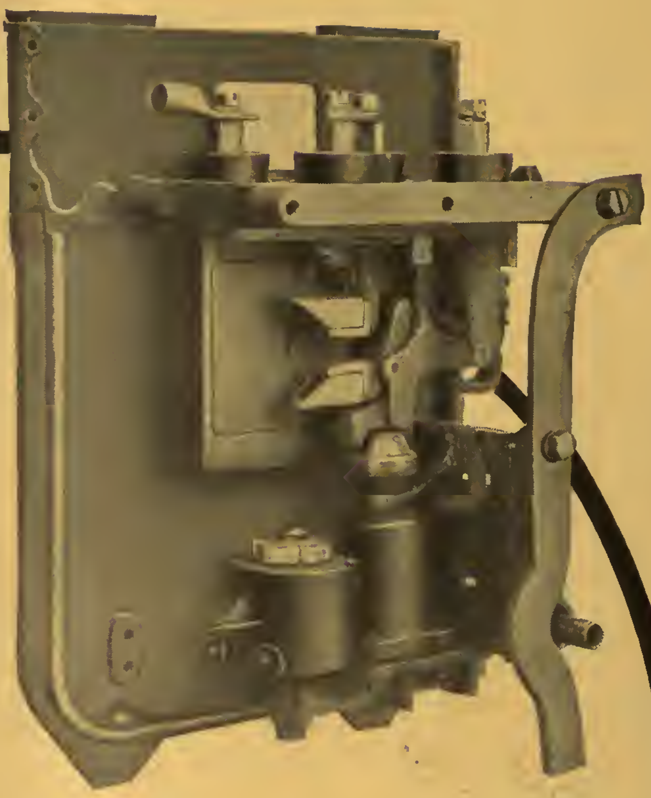
The Latest Type 480 Unit Switch For HL Control

The Type 480 Unit Switch has been designed to increase the life of the wearing parts and to provide a quickly removable arc chute. Only such new parts as are essential to increase life are employed. The complete switch unit is interchangeable with the 250 or the 264 units. Maintenance men will immediately recognize the value of the following features:

1. The greater part of the wiping contact has been replaced by a rolling contact. There is just sufficient wiping action to keep the contacts clean.
2. Heavy, cast-copper arcing horns are used.
3. The arc chute can be completely removed by taking out a wing screw. It is reversible and the parts are interchangeable.

Some of the other improved features for the group assembly are:

1. Heavy copper terminal studs which allow the removal of the connecting straps without releasing the bolts from the switch bracket. This permits an absolutely tight contact between the straps and the stud.
2. New Micarta Duck cup washers which increase the insulation in the top of the group and allow the elimination of the fish paper, base-plate insulation. By the use of this improved insulating cap, shrinkage is practically eliminated and, hence, the possibility of terminal studs loosening is reduced.
3. Bent copper connection straps are used instead of the flat type. The use of this type of strap eliminates the necessity of copper spacing washers.



The new Type 480 Unit Switch is so designed that types 251 and 264 can be converted into the improved Type 480 at little expense. We recommend that customers who wish to obtain the advantages of the new design on their old equipments, purchase the necessary parts to make the change.

Each switch group should be changed over as a unit. Consult our district office salesmen for all particulars.

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East Pittsburgh, Pa.

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Mailing Department

As we approach the mailing department where more than thirty girls are at work, we hear cheerful sounds that remind us of country homes and holidays and bursting popcorn. Automatic typewriting machines are speeding, letters are being folded, sealed, stamped, and addressed.

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Number of copies printed 5,875

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.
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Published weekly
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
Printed in U. S. A.

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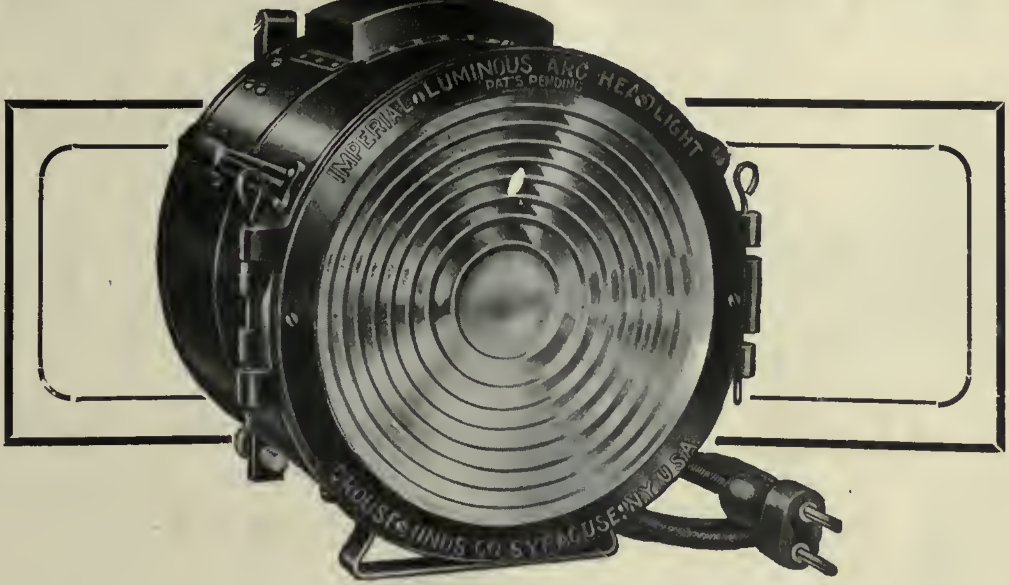

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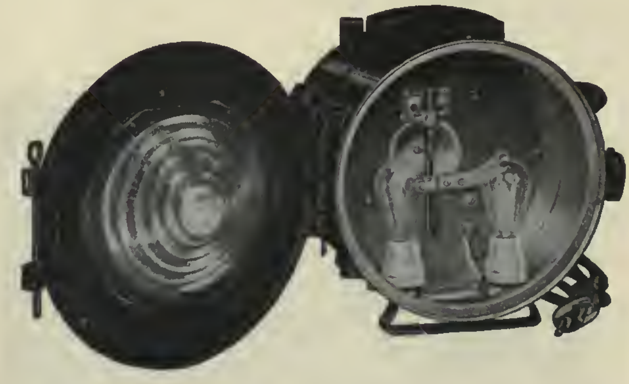

The arc and mechanism are completely separated in compartments. Fumes from the arc cannot reach the mechanism.

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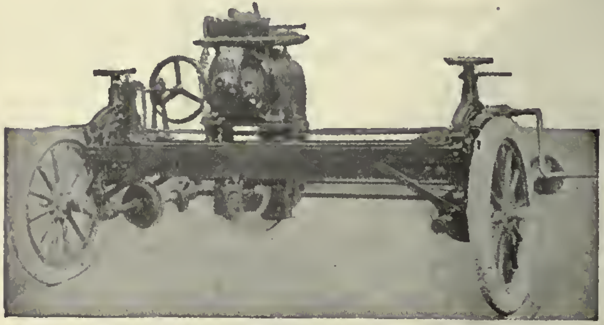

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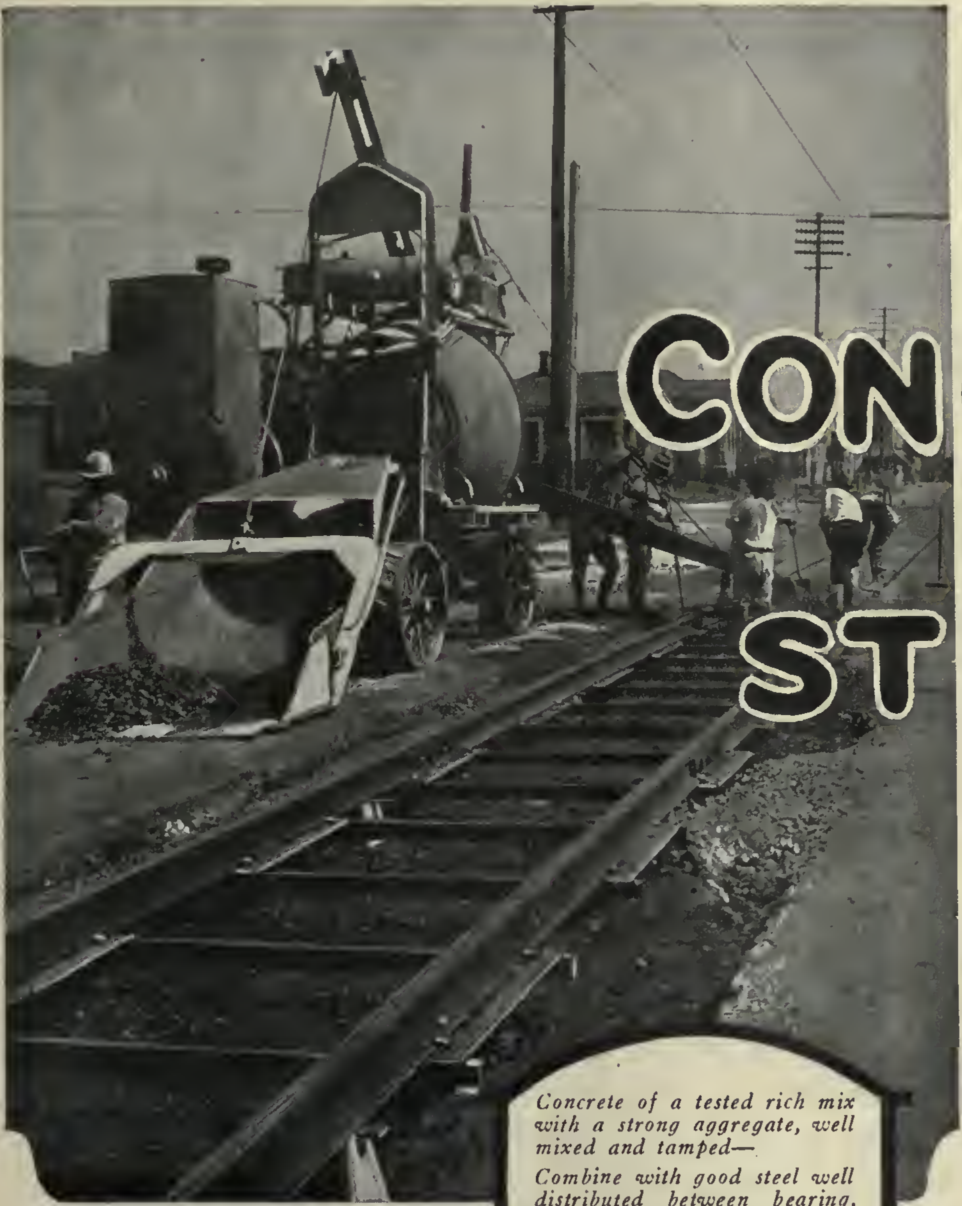

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STEEL

Concrete of a tested rich mix with a strong aggregate, well mixed and tamped—

Combine with good steel well distributed between bearing, reinforcement and tie members. These are the logical permanent materials for the foundation of the best paved track.

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Is Here

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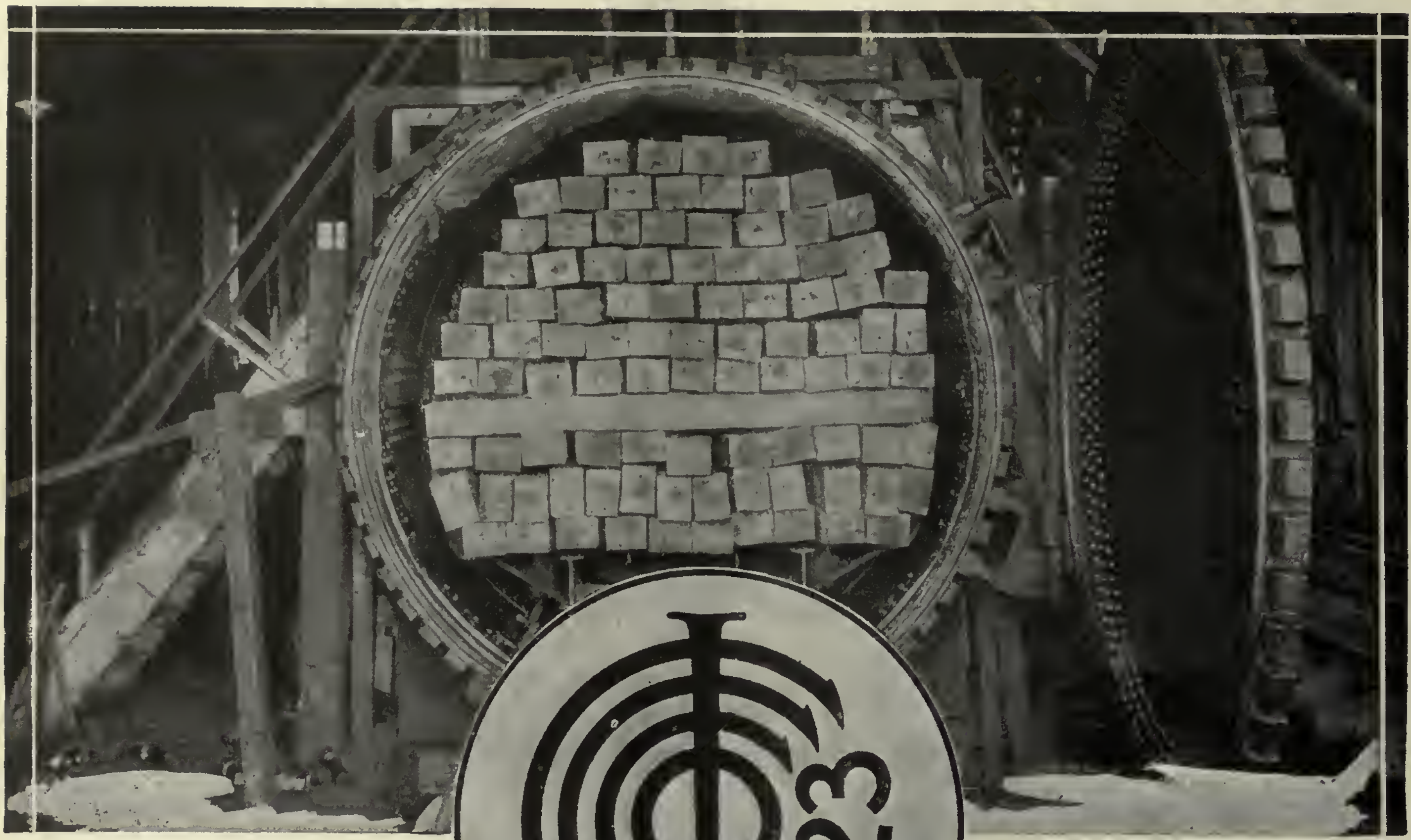

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A poor tie well treated will not answer, nor will a good tie poorly treated. In either case your money is wasted. You must have a good tie well treated to get good results.

At the International Plants only sound ties are treated. Ties with any signs of wood destroying fungus are set aside and burned.

The seasoning and preservation of International Ties are at all times under the direct supervision of men having full knowledge of timber and thoroughly experienced in its preservation.

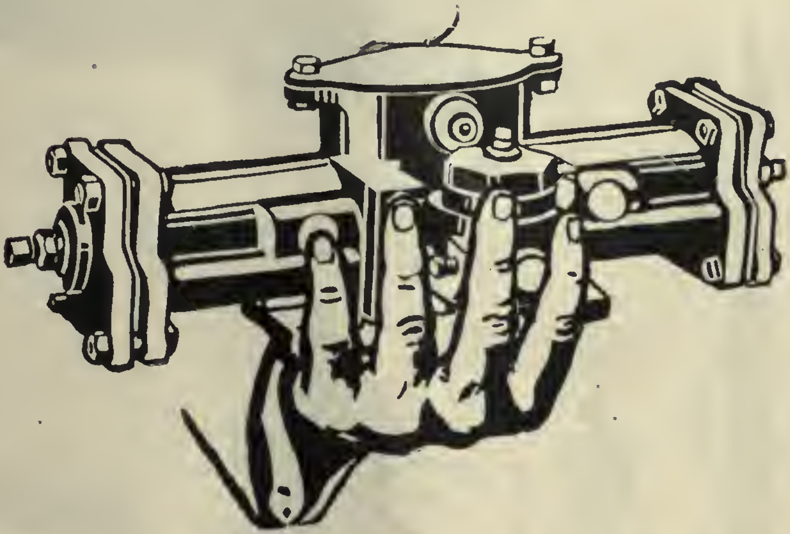
High grade preservatives and efficient mechanical equipment assure thorough and effective penetration.

We feel confident that we can save you money in your annual tie requirements.

International Creosoting & Construction Co.
General Office—Galveston, Texas
Plants: Texarkana, Texas Beaumont, Texas Galveston, Texas

INTERNATIONAL TREATED TIES

SERVICE



Whatever you purchase, the service you receive with your purchase and afterwards, is usually the determining factor of a satisfactory investment.

Service is our watchword!

NATIONAL PNEUMATIC SERVICE is a conspicuous feature of every door engine, every connecting rod and every bolt you order from us. Our service consists not alone in furnishing a perfectly-balanced operating unit, but also in the fact that our experts are at your disposal for service from the conception of the installation until it is operating satisfactorily on the road.

Call for National Pneumatic Service
early in the game. It pays!

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Manufactured in Canada by
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COMBINATION POLES
Ornamental and Economical

To put the finishing touches of adornment on that new bridge or highway, install Elreco Combination Railway and Lighting Poles. Avoid the mistakes of former years, whereby otherwise fine-appearing streets and avenues have been cluttered up with a veritable forest of wooden poles and a maze of electric wires. Combine your railway and lighting poles in one — Elreco Poles. It is an artistic as well as a sound economical policy to follow.

Elreco Poles are provided with the finest G. E. Novalux lighting fixtures. Elreco Poles are strongly built, yet light in weight. Their initial cost is reasonable, their maintenance cost a minimum.

Let us send you all the data

The Electric Railway
Equipment Co.
30 Church St., New York
Cincinnati, Ohio

Announcement

ALUMINUM FIELD COILS

Aluminum field coils have marked engineering and economic advantages.

More than a year's experience in the sales and engineering development of aluminum field coils has shown that the principle is fundamentally correct.

As usually happens, with any newly introduced product, there have been some defects, but thorough analysis has shown clearly that these defects have been due to errors of manufacture rather than to theory of design.

Accordingly, contracts have been closed which give the undersigned and his business associates complete control of the production and design of Aluminum Field Coils, manufactured under the Lind Patent process. Plans are under way for installing improved manufacturing equipment.

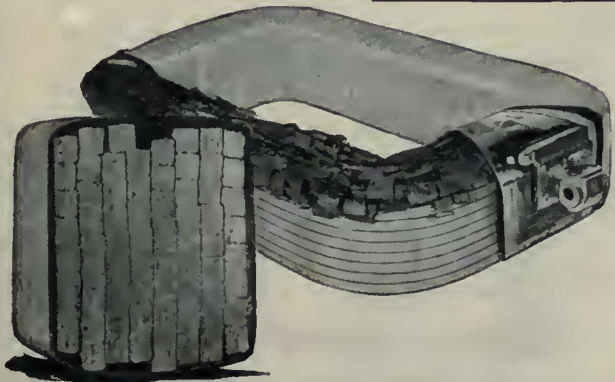
The manufacture will be under the personal direction of Mr. J. T. Lake, who has had a wide electric railway operating and engineering experience.

Mr. Jacob Lind, the patentee and a former manufacturer of Aluminum Coils in Europe will be associated with Mr. Lake.

The sales and field service will, as for the past year, be handled by the Economy Electric Devices Co., 1592 Old Colony Building, Chicago and its distinct agents and representatives.

L. E. Gould

Old Colony Bldg., Chicago, Ill.



Aluminum field coils are designed to give the same field strength as copper coils and in addition they possess the following advantages: longer life, fifty per cent weight reduction, quicker conduction of heat, less affected by moisture, less chafing, fewer renewals and less total cost.

The Answer to 6 Searching

The Long View

The long view—what is it? Permanent, low-cost track construction to begin with.

Nurturing public good will by means of, as nearly as possible, shockless and noiseless operation, in the second place.

And, finally, increased profits for street railway companies.

How? The DAYTON Resilient Tie.

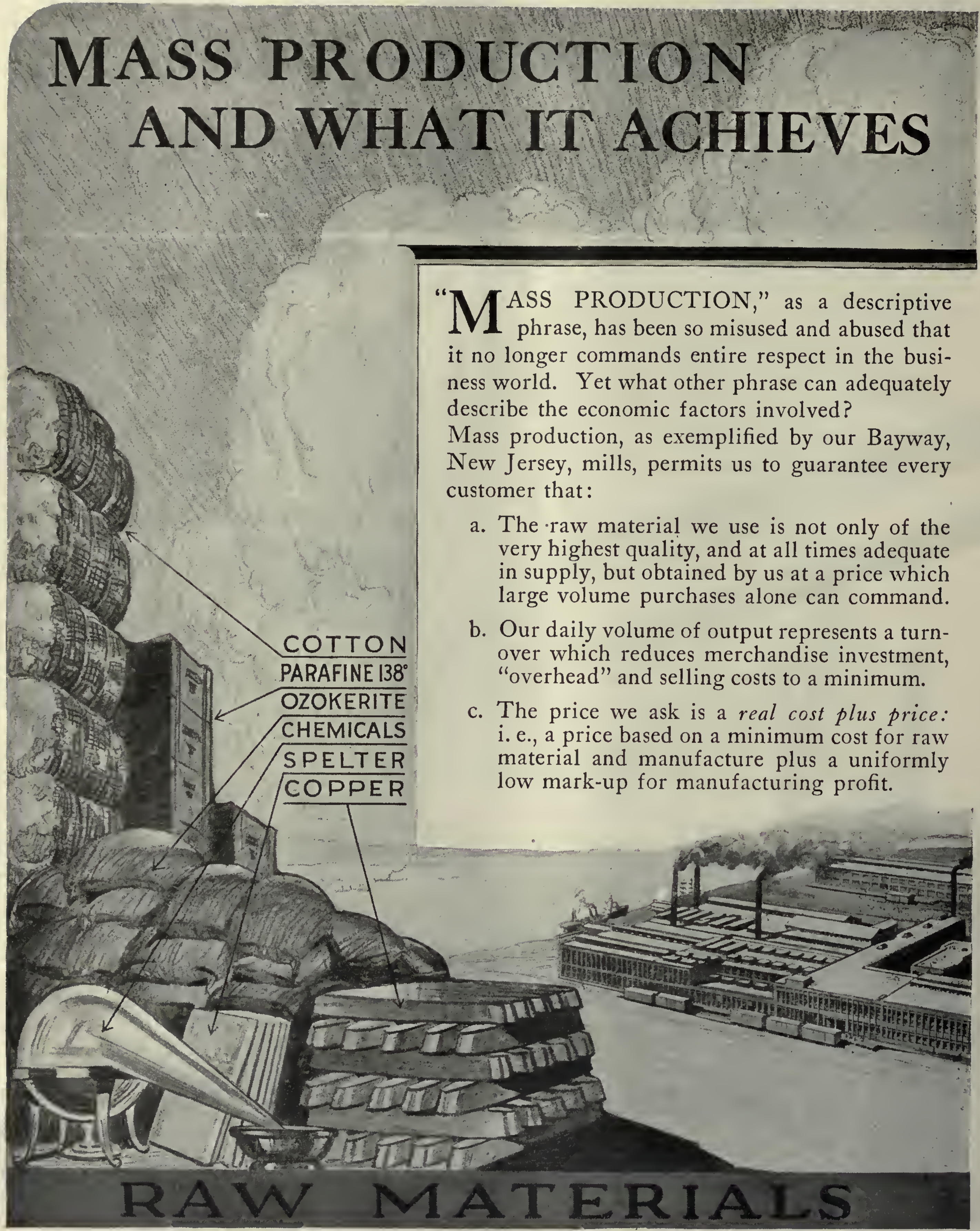
DAYTON

Street Railway Questions

1. How can the cost of new track be reduced?
2. How can the life of track be increased?
3. How can track and paving repairs be reduced?
4. How can the upkeep for rolling stock be reduced?
5. How can power be saved?
6. What can be done to lessen traffic noise?

The answer: through the use of DAYTON Resilient Ties. Figures *prove* that their use results in a substantial saving over wood ties in gravel ballast, and a much bigger saving over wood ties in concrete foundation. Ask for the PROOF that the DAYTON Resilient Tie is the answer to the other five questions as well.

THE DAYTON MECHANICAL TIE CO.
707 Commercial Bldg.
DAYTON, OHIO



MASS PRODUCTION AND WHAT IT ACHIEVES

"MASS PRODUCTION," as a descriptive phrase, has been so misused and abused that it no longer commands entire respect in the business world. Yet what other phrase can adequately describe the economic factors involved?

Mass production, as exemplified by our Bayway, New Jersey, mills, permits us to guarantee every customer that:

a. The raw material we use is not only of the very highest quality, and at all times adequate in supply, but obtained by us at a price which large volume purchases alone can command.

b. Our daily volume of output represents a turnover which reduces merchandise investment, "overhead" and selling costs to a minimum.

c. The price we ask is a *real cost plus price:* i. e., a price based on a minimum cost for raw material and manufacture plus a uniformly low mark-up for manufacturing profit.

AMERICAN COPPER PRODUCTS
CORPORATION
233 BROADWAY NEW YORK

FOR BUYERS OF COPPER WIRE

Mass production means not only price advantages to the purchaser of copper wire: it also means unquestionable quality of product. For the larger the output the more imperative the necessity for the manufacturer to stand squarely behind his product.

Something of interest about the *quality* of our product in our next announcement.

AMERICAN COPPER PRODUCTS CORPORATION

Trade Mark

COPPER PRODUCTS

- *Round Bare Wire*
- *Bare Strand*
- *Trolley Wire—Round and Shaped*
- *Flat and Square Bare Wire*
- *Tinned Wire and Strand*
- *Weatherproof Wire and Strand*
- *Slow-burning Wire and Strand*
- *Bus Bars*
- *Copper in Rolls*
- *Rolled Rods*
- *Drawn Rods—Round, Square and Rectangular*

BRASS AND BRONZE PRODUCTS

- *Brass and Bronze Sheets*
- *Brass and Bronze Round Wire*
- *Brass and Bronze Flat and Square Wire*

AMERICAN COPPER PRODUCTS CORPORATION

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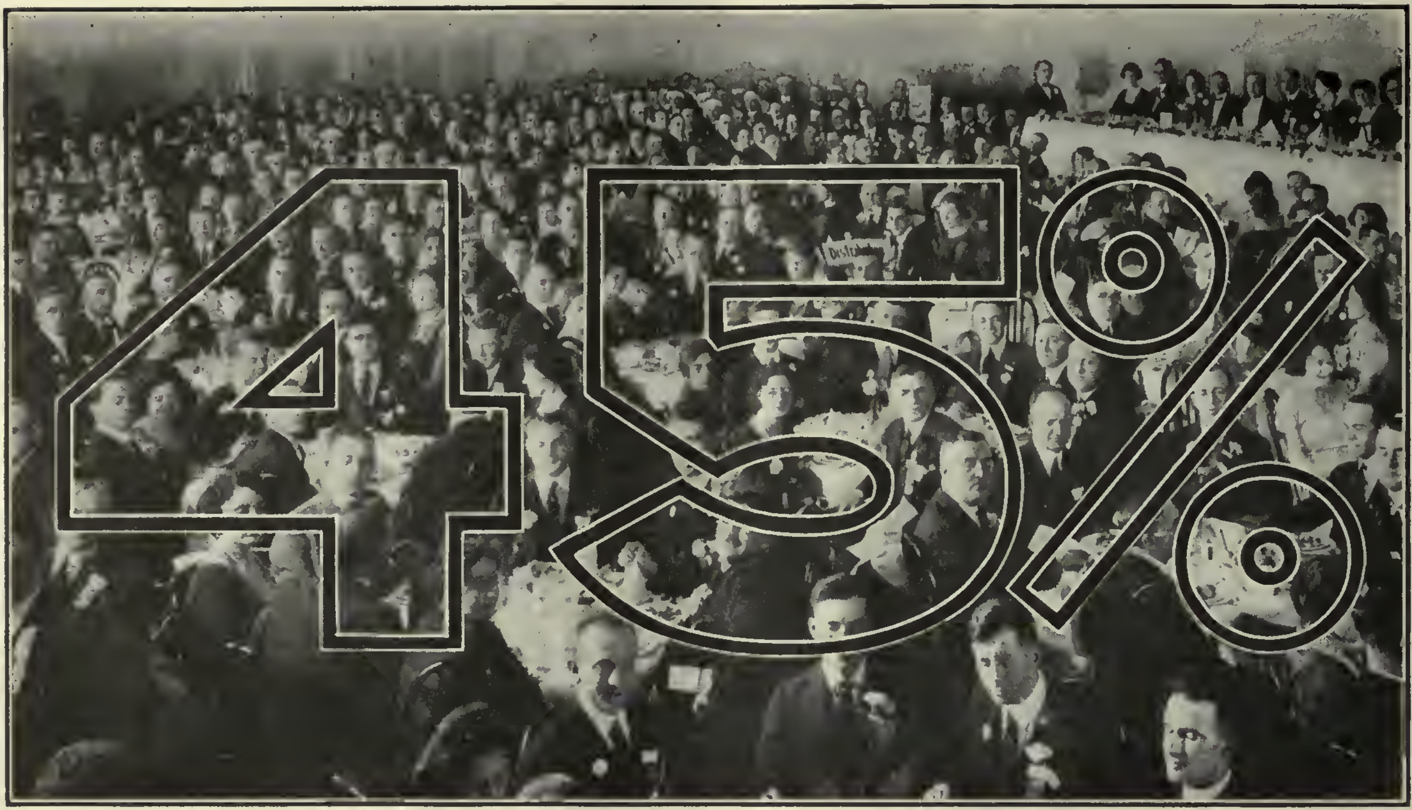

THERE ARE 45% MORE NAMES

ON THE LIST OF EMPLOYERS CARRYING GROUP INSURANCE IN THE TRAVELERS THAN ON THE GROUP LIST OF ANY OTHER COMPANY

SOME OF THE REASONS

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2. Payment of death claims within 48 hours after notice.
3. Over a hundred claim offices in the United States or Canada, meaning prompt service no matter where employees may be located or may travel.
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5. The fact that employees instantly recognize a Travelers contract as the best in insurance.
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9. Safety bulletins, danger signs, safety pamphlets and books, The Travelers Standard.
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THE TRAVELERS INSURANCE COMPANY — THE TRAVELERS INDEMNITY COMPANY
Hartford — L. F. BUTLER, PRESIDENT — Connecticut

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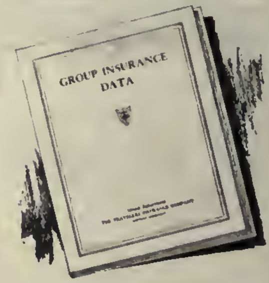
We have prepared a portfolio on Group Insurance for business executives. Send for your copy today.



QUALITY-SERVICE-ECONOMY
GALENA-SIGNAL OIL CO.

With Galena Oils and Service in the Field

Comparative tests of lubricants, under like conditions of service, provide better means of ascertaining the lubricating ability of oils than all the claims and promises that could be offered. Actual service shows their merit or shortcomings—it must determine their value.

The marked success of Galena Oils in demonstrating their superior lubricating qualities through tests with competitive products must be significant to observing officials of electric railways. There is not a single instance in which they have failed to do this most convincingly.

The reputation of Galena Lubrication Service is built upon achievement. Its records of performance are available from properties under Galena lubrication in your district—in every section of the United States. Compare them with your own. Tests are welcomed. They will prove to your satisfaction that Galena lubrication means both efficiency and economy.

From our Service Engineer's Reports*

"While the other lubricant was being used, it was necessary to pull the packing in the journal boxes every week. It was also necessary to turn the waste in the armature and axle bearings once a week to keep from glazing. The test of Galena Oil began January 12th. The journals ran sixty-eight days without being touched and I assured the General Superintendent they would go ninety days without attention. The armature and axle bearings were given one-half gill of oil every four days. The officials informed me that the signing of the contract was due to this demonstration. Galena material will be used on a schedule of ninety days' application to journals and four days to armature and axles."

"Recently a test of this material was made in journal boxes. Two hot boxes within eighteen miles resulted. The M. M. opposed the test, stating that 'he has used Galena Oils for over 20 years and every time he had tried other materials he had run into trouble.' In sixteen years on this property he has not had to renew an armature shaft on account of having been worn too small, and hot bearings of any kind were almost unknown. The General Superintendent said he was through with such experiments, as some years ago he changed oil in the power house, which cost his company over $2,500 for repairs to engines on which the new oil was tried."

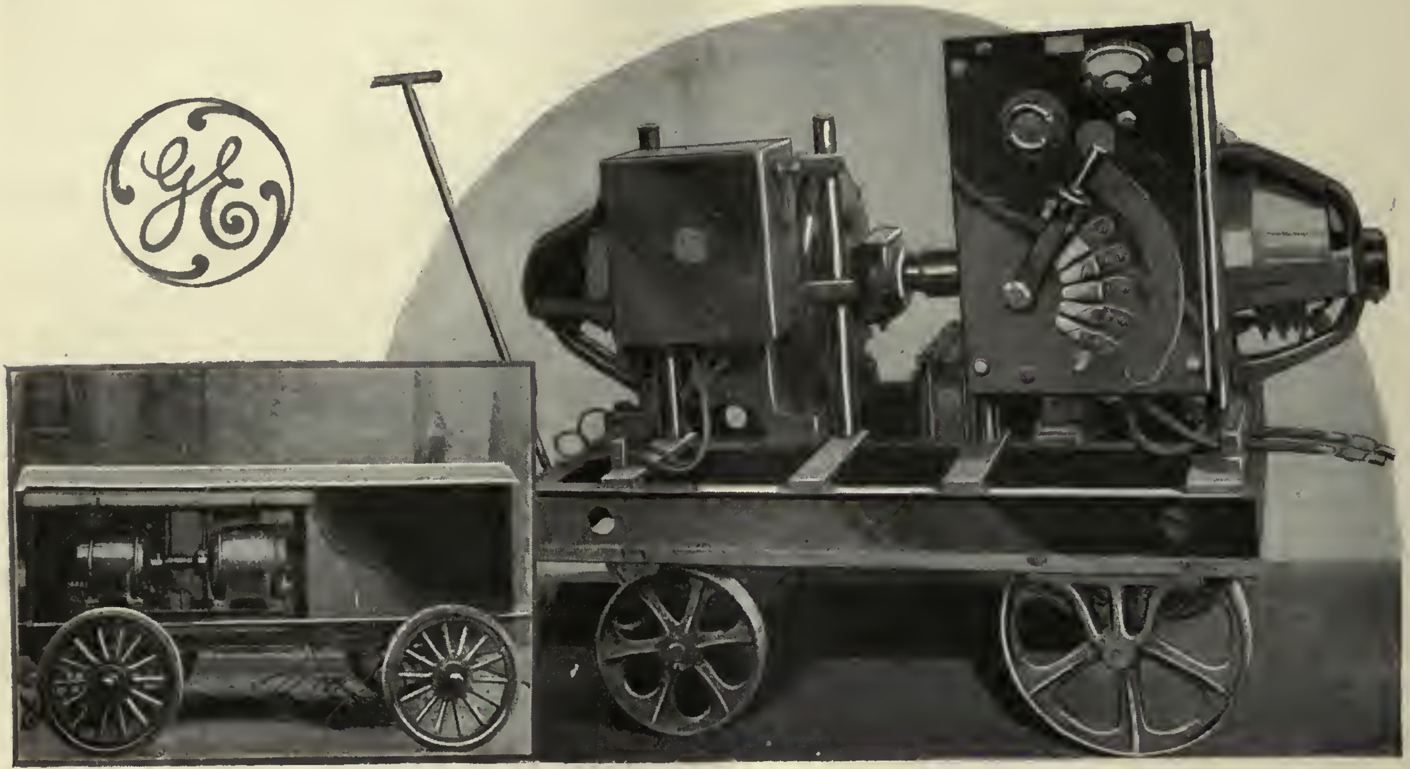
**These excerpts are taken from the weekly reports of our Service Engineers. We vouch for their reliability and accuracy in every detail.*

QUALITY-SERVICE-ECONOMY
GALENA OILS

Galena-Signal Oil Company

New York Franklin, Pa. Chicago
and offices in principal cities

Here's the Arc Welder for You



One Railway Company uses this means of mounting "WD-9" for track work.

"WD-9" does great shop and track work!

Representative Users

Eastern Mass. Street Railway
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"WD-9" was specially designed to run at constant speed where the supply circuit varies even as much as 400 volts minimum or 650 volts maximum. It gives the operator constant conditions in the arc—and that means good welding. It is a compact, well-built set—easy to use and economical to operate.

Here are some of the things "WD-9" will do right for you if you team it up with a welding operator who knows his business. It repairs truck frames—brake hangers—journal boxes—gear cases—resistors—drawheads and underframing—flanges on worn car wheels—worn journals on armature shafts—broken and worn motor frames. It readily repairs railway tracks—and is used for rail bonding.

Get acquainted with "WD-9" at any of the G-E Sales Offices which are in all large cities.

GENERAL ELECTRIC

43B-750

New York, Saturday, September 15, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

Henry W. Blake and Harry L. Brown, *Editors*

Volume 62
Number 11

Coal Commission Report on Civil Liberties

THE United States Coal Commission has issued its report on the violations of civil liberties in the coal industry—an intensely interesting and informative document. It is an eminently fair treatment of this phase of the causes of conflict between the operators and miners. While condemning various practices on both sides, it finds that any fixing of responsibility for past violations is practically impossible. It disposes of the Herrin murders in a manner that is rather startling, viewed from the light of true American justice, but finds that all justice is human and fallible and that "it will only approach perfection when the intelligence, the judgment and the conscience of men are educated more and more toward higher ideals. . . . The law has been, is now, and ever will be but the average of the judgment and conscience of the community."

The commission took volumes of evidence, out of which it says it would be possible for one to show that the miners were intent upon unionizing all the mines of America, even by force if necessary, or that the operators were determined, by use of force if necessary, to break up the United Mine Workers—whichever way the reviewer's bias might lean.

But the commission chose to seek something better for the future than the mere fixing of responsibility. The most definite corrective proposal in this report is that Congress must compel full publicity of their activities from both operators and United Mine Workers in prescribed reports to some governmental agency "to the end that the people of America may determine whether they will longer permit, even under governmental supervision, the existence of these artificial persons (*de facto* or *de jure* corporations)." The final admonition is that "if neither the patriotism, private conscience nor business common sense of the industry shall lead all persons engaged in it not only to observe the law but to help enforce the law; and if state and local authorities shall be impotent in prosecuting and convicting violations thereof, then it is the solemn duty of the Congress of the United States to assume jurisdiction over these American rights, bringing the full power of the Union to their preservation by the prosecution and conviction of all persons, whether high or low, who shall dare to violate them. The legislative, judicial and executive branches of this government must not permit a union of operators, a union of miners, nor a union of both to become greater than the Union of the States."

These are plain statements for the benefit of the coal interests. Just exactly what the commission means, however, is obscure. One can easily read into them that in case of a strike the government would take control of the situation by providing ample protection of the mines and then inviting whoever would to work them. Some such interpretation as this seems reasonable, as the commission is on record as being opposed to nationalization of the coal industry.

The commission's report is valuable particularly for the unbiased enlightenment it affords on the causes of trouble. The commission has done its part well, and the evils in the situation which it sets forth would, if eliminated, bring peace to the industry and satisfaction to the public. Unfortunately, however, there is required a long process of corrective measures and the moving of many minds before the coal consumers will reap any benefits. Yet there seems to be no short cut. The most promising hope is that the operators and miners will catch the spirit of the report and themselves take steps to correct the practices frowned upon.

Who Shall Go to the Convention?

LAST year, after the convention at Chicago, the chief executive of one of the largest railways—he himself had not gone to the convention—called a meeting of company executives and department heads to find out what had happened at the convention. Addressing one of his principal executives, he inquired what was the outstanding thing he found at the convention. This man thought a while and finally said he considered a certain address was the best thing there. Passing down the line the same question was put to each man and each, in turn, gave the same answer. The chief executive voiced surprise at such unanimity of opinion among men of such different tastes and experience and started to question their power of discernment.

"Was this all that happened at the convention? What did each of you get out of it?"

In answer to this each man told of some details in his particular line of work that had appealed to him, but when the rounds had once more been made the chief executive was still dissatisfied.

"Didn't any of you get a picture of the whole situation? Where is the industry trending? What are the outstanding problems? I can commence to piece together the parts you bring back and draw some conclusions, but they are inadequate. Here this company has spent hundreds of dollars sending ten or fifteen men a good many hundreds of miles to a convention and I can get only a piecemeal report—no one has the whole picture!" One of the younger department heads spoke up:

"It looks to me that what was most necessary was that you should have gone to the convention yourself, for you can see the whole situation. We were each busy in our own line and benefited from it, but what was missing was your ability to measure it as a whole —your own contact with other executives."

The younger department head was right. There is something at a convention for everyone in the company, from chief executive down. Each will get value from the convention in his own way and in proportion to his capacity. It is important that chief executives send their engineers, their transportation men, their accountants, their claim agents, their publicity men, and their various executive associates and assistants. But it is still more important that they go themselves and take an active part in the whole convention. It is of too much importance to attempt to measure, with the above-described unsatisfactoriness, the trend of conditions in the industry through reports of others. Who will go to the convention from your company? Make it a full delegation from president clear down the line!

More Thought to Reward for Selling Transportation

APPARENTLY quite a little thought is being given to bonus schemes for inducing trainmen to exercise greater care in avoiding accidents, as some thirty companies have now adopted some such plan. The interesting thing about this is that every one of these companies reports a very decided improvement in the accident record, in spite of the fact that in some cases the amount of the reward seems almost inconsequential. What seems strange is that not more thought is being given to plans for rewarding the trainmen in making better efforts to merchandise transportation. The result of bonuses in accident prevention is to save a percentage of a small piece of the total expenses, while a bonus for selling more transportation would make an improvement in the gross revenue. While it is realized that it is extremely difficult to apply a commission or bonus plan to the work of the trainmen, nevertheless the possibilities are so great that it warrants more thought than is being given the subject.

The San Diego Electric Railway has a plan whereby 3 per cent of the gross amount received from the sale of certain forms of transportation, principally 7½-cent tickets or tokens, and weekly passes is paid to the platform employees on the basis of hours worked. The result of the plan is that platform employees are receiving an increase in the hourly rate of pay of about 4 per cent or from 3.5 to 5 cents an hour above the scale.

A new idea is embodied in the bonus plan inaugurated the first of July by the receiver of the New York & Queens County Railway on Long Island. This provides that the men shall receive 1 cent an hour above a fixed rate of pay for every cent that the average earnings per car-mile during the month exceed 31 cents. To the railway executive this means that out of every 7 to 9 cents additional revenue turned in per car-hour 2 cents is given to the crew, but it has seemed to be difficult for the New York & Queens trainmen to understand that average earnings per car-mile of 1 cent an hour more than 31 cents means 1 cent an hour more pay for them.

This last plan has some merit, but it has the same weakness that is common to all plans now in effect, so far as these are known, which is that the basis of arriving at the bonus is a matter remote from the trainman. He cannot figure it himself, even though he might understand the basis of computation. He does not have the immediate feeling that for every passenger he gets on his car there is something in it for himself.

Whenever it is proposed that individual trainmen should get a certain percentage of every fare collected, the experienced transportation man maintains that the trainmen would then drag the line. This and most of the other practical defects in the direct bonus plans are matters of discipline. This means that enough supervision must be provided so that rules will be observed. Because it never has been possible to work out a satisfactory bonus plan need not necessarily be taken as proof that such a plan cannot now be worked out. It is a thing that is particularly needed these days. Trainmen want higher wages, yet higher hourly wages do not increase the inducement for them to sell the service. Perhaps a simple, direct bonus plan that would mean real money to the trainmen would make them think well enough of their jobs to permit of the high order of discipline necessary, and would develop in them the energy and selling instinct so badly needed to cope with the growing competition of the private automobile, the motor bus and the sidewalk. At any rate, some new thinking in this direction would not be time wasted.

Pollyanna—or Mr. Gloom?

A MAN who attended a recent electric railway convention commented on it afterward as follows:

"Throughout the whole meeting there was a spirit of depression and gloom. The speakers did not aid any in enlightening the situation to the operating men of the state. If I were an operating man in that territory I would feel uncertain about my job, and would be much discouraged regarding the future."

The same man, after telling something of the scope of the papers presented, made this further observation:

"If conditions exist as they say they do there relative to the railway situation I would think it highly desirable to import some speakers from the outside who might give advice and counsel on things to be done to improve the situation. In the absence of this, the discussion had to do largely with the serious difficulties confronting one of the railways in the territory, and the result was that a general depression prevailed throughout the meetings."

In the past few years electric railway men have had a tendency at times to meet and tell each other how bad things are, and how hopeless it is to try to better them. But is that the true state of affairs in the industry generally? Statistics for eighty companies printed on page 73 of the issue of the JOURNAL for July 14 show that the greater revenue during the first four months of 1923 has been more than enough to offset the rise in expenses. The operating ratio has continued to drop, and as this is a measure of the underlying condition of the industry, it can be said that it is in a stronger position today than it was at the end of 1922, and in fact than it has been at any time since 1916. And then the trend was downward, while today it is upward, which is distinctly encouraging.

The industry, by and large, is now on a firm basis, despite the various prophets of gloom. Naturally it is unwise to adopt the attitude of Pollyanna, and see only the good side. There is yet much to be done in modernizing the whole business of transportation and better adapting it to the present-day needs of a rapidly growing country. A sure way to bring cause for gloom is to let things drift in an aimless way.

Conventions and meetings of railway men are much more helpful when the delegates devote the time to the exchange of constructive ideas that will lead to better handling of the individual road's problem. Nothing much is gained by a rehearsal of ailments. These are the things that should be kept well in mind by those who are responsible for convention programs. There are few bellwethers in the flock, and to them the others look for information and guidance.

Hauling Ford Workers

The 70,000 Employees Engaged at the Highland Park Shops Present a Big Traffic Problem—Mr. Bibbins Analyzes the Conditions — Prepayment, Queue Loading, Additional Streets and Better Traffic Regulations Among Recommendations

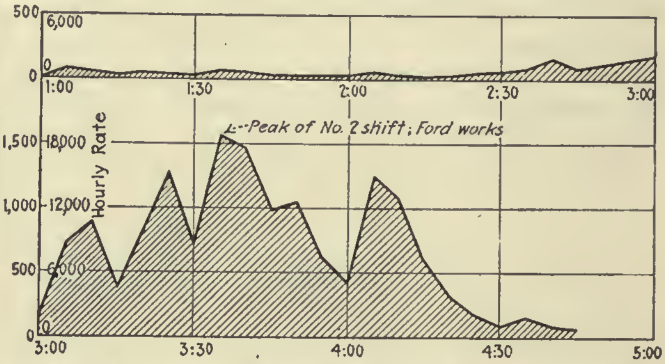
THE transportation problems involved in the carrying of the 70,000 employees to and from the large Woodward Avenue plant of the Ford Motor Company in Detroit are unique. Strictly speaking, the plant is not in Detroit, but in Highland Park, which politically is a separate municipality, but surrounded entirely by the city of Detroit. Acting for the Council of this city, J. Rowland Bibbins of Washington, D. C., recently made a study of the situation and from the preliminary report submitted by him the accompanying facts and suggested remedies are taken. A later report with detailed plans and final recommendations will appear in abstract in another issue.

On Woodward Avenue, the main northerly highway from Detroit, and about 6½ miles from the business center of the city is a large rectangular tract of land with a frontage on each side of the street of about half a mile and a depth on each side of about a mile to a mile and a half through which there are no north and south secondary through streets to relieve the traffic on Woodward Avenue. The southern half of the tract on the west side of Woodward Avenue is occupied by the Detroit United Railway and the Department of Street Railways of the City of Detroit. The rest of this large area is reserved for use by the Detroit Terminal Railway and the Ford Motor Company, whose main factory is on the east side of Woodward Avenue, directly opposite the car yards of the Department of Street Railways. A short distance to the north of this tract are large park and cemetery properties which limit the opportunities for housing and traffic movement in that direction.

The output of the Ford works has doubled three times in ten years, and about 70,000 men are now employed there, an increase of more than five times since pre-war days. At present the number of workers leaving the factory is about as follows:

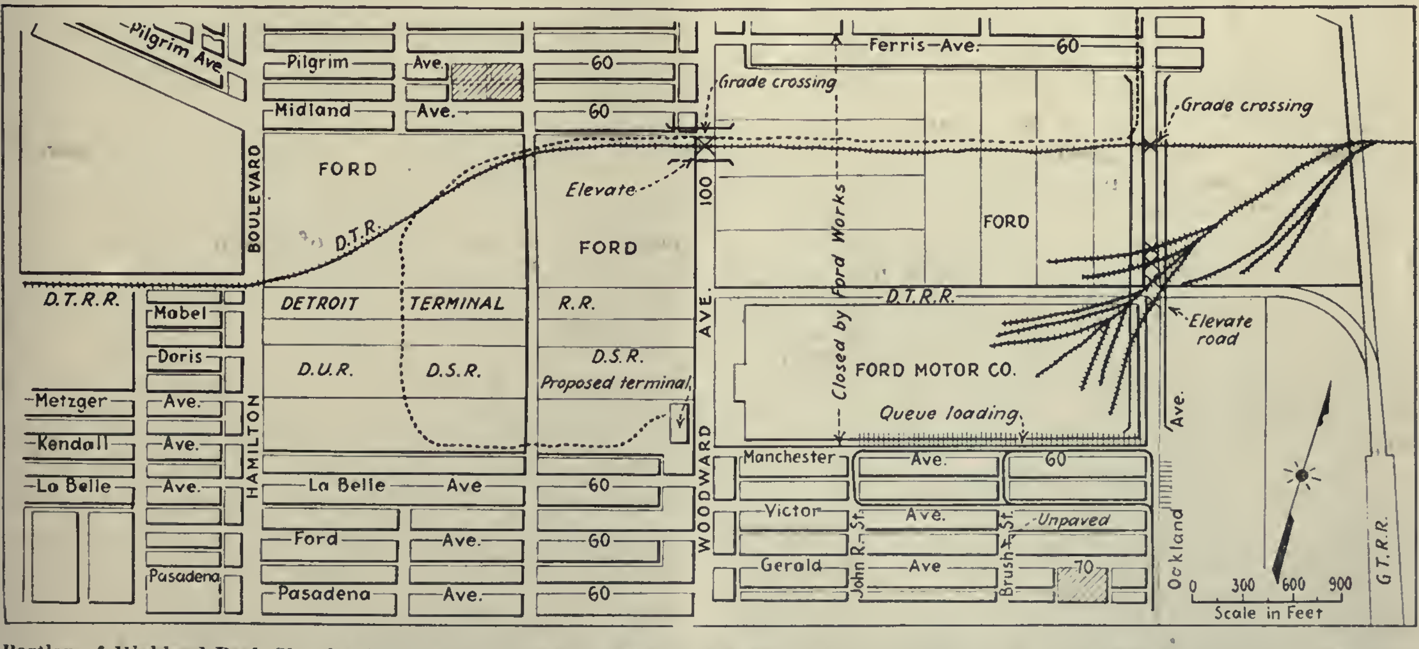
Shift No. 1, 7:30 a.m., 10,000 men
Shift No. 2, 3:30 p.m., 38,000 men
Shift No. 3, 11:45 p.m., 21,000 men

In addition to these factory workers, there are approximately 700 office workers leaving at 5 p.m., 750 trade school workers leaving at 4:30 p.m., and 550 visitors per day. It is estimated that from 20 to 25 per cent of the employees live within walking distance of their work, and about two-thirds use Woodward Avenue traffic facilities.



Pedestrian Movement on Manchester Avenue, Showing How the Ford Works Staggers the Release Times of Its Departments

The pedestrian movement out of the works on the afternoon shift exceeds at one point, Woodward and Manchester Avenues, a rate of 18,000 people an hour, not including the incoming shift. This is shown by the diagram charting the pedestrian movement for an average day (June 29, 1923) on Manchester Avenue between 1 p.m. and 5 p.m. This curve shows clearly the result of scientific scheduling by the Ford works

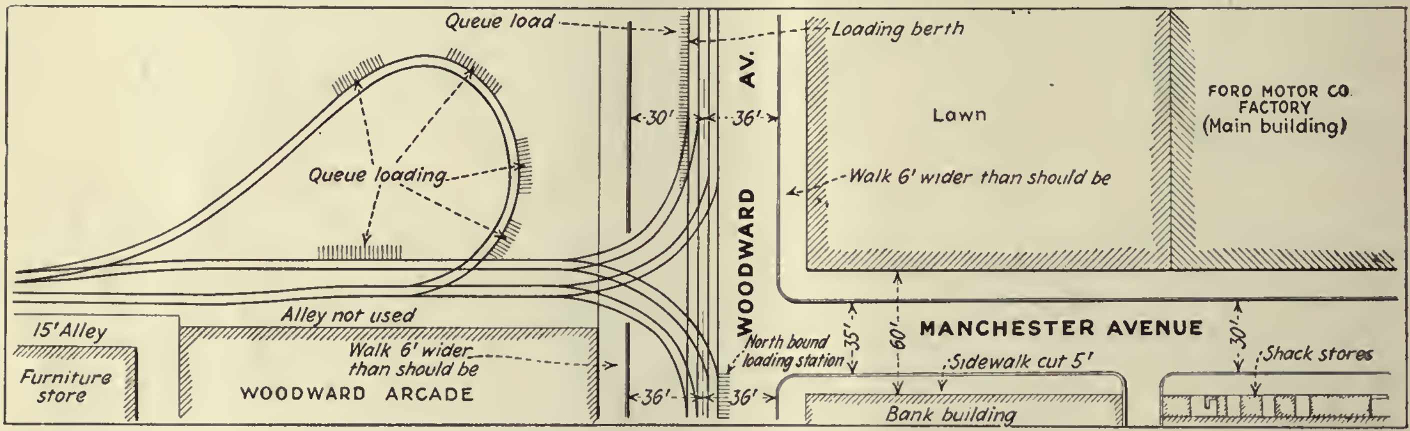


Portion of Highland Park Showing Ford Works, Detroit United Railway and Detroit Street Railway Properties, Proposed Terminal, Etc.
(Dotted line shows connection to proposed terminal of interurban line running north. Electric railway tracks on Woodward Avenue omitted from this drawing.)

to spread the peaks. In fact, the plan of staggered hours of work adopted by the Ford Company has been the only thing which has saved the situation up to the present. The main afternoon shift is discharged at intervals throughout the hour from 3:30 to 4:30, with the new shift entering between these intervals.

The city of Highland Park alone could not house this vast number of employees. In fact, its population trend has lagged behind that of assessed property values and output of the Ford factory, and the employees seek their homes in all parts of Detroit and its suburbs. A diagram showing the percentages which travel the different distances, based on pre-war conditions, is given.

The great bulk of those who need transportation to and from the works use the street cars on Woodward Avenue of the Detroit Municipal Railway. This movement has reached about the maximum possible under present loading conditions, i.e., a two-car train every sixty seconds with practically full car loading. Passengers board the cars at present in the street or on the loops in the Detroit municipal car yards, in queues, and the loading speed averages one second or more per passenger boarding. It will be noted that this movement of factory employees is in the contrary direction to the normal city rush-hour traffic, morning and evening. This is most fortunate as it results in a large proportion of the railway tripper cars securing full inbound load just prior to a full outbound load from the city. Thus, the development of industrial subcenters is seen to be an extremely valuable aid to efficient traction service.



Detail Map of the Congested "T" Junction of Woodward and Manchester Avenues

In addition to street cars there is on Woodward Avenue a loop of jitney service. These jitneys are large eight-passenger automobiles which, during the rush hour, operate on a headway of about one-half that of the street car trains. The fare on these motor cars to downtown Detroit is from two to three times the fare on the trolley cars, and the speed is nearly twice that of the latter. This service was encouraged by the city when the railway was operated by a private company, and the jitneys are now in litigation to retain their licenses in competition with the municipal railway.

The third transportation service is given by private automobiles. On the Ford grounds are special parking places for company employees, and about 2,500 cars park there daily. Some other private parking space is available, and there is some parking on neighboring streets. In a count made on June 28, 1923, between 3:10 p.m. and 4:30 p.m., 1,200 automobiles per hour were found to be moving south on Woodward Avenue past the corner of Manchester Avenue, 915 moving north on Woodward Avenue, 226 moving east and 169 west on Manchester Avenue in addition to 10,920 pedestrians homeward bound through this street, mostly crossing Woodward Avenue.

The greatest congestion occurs at the corner where Manchester Avenue enters but does not cross Woodward Avenue. At this "T" street junction there is a traffic during the rush hour of about 200 street cars, 1,800 motor cars, and from 10,000 to 20,000 pedestrians.

RECOMMENDATIONS FOR IMMEDIATE RELIEF

Mr. Bibbins makes a number of suggestions for immediate relief, among them the following:

1. Abolish left-hand turns at the main "T" crossing.
2. Parking yards to be made one way, with exit off the main highway.
3. The motor bus and jitney loading station to be moved away from the main street car loading station.
4. Carhouse switching to be done off the main highway tracks.
5. Electric switches or switchmen at all heavy mainline branchoffs.
6. No parking opposite car loading or air service station. The compressed-air tank system is still used in Detroit.
7. Reserve a 25-ft. far-side stop for motors at all near-side car line stops to clear the roadway.
8. Co-operation with business firms and industries to reroute traffic around the congestion instead of through it.
9. Roadway widening where conditions demand, so as to provide at least one clear free line of traffic.
10. The opening of secondary relief streets, with grade separation over the steam railroad shop tracks in the rear of the Ford plant.
11. Good paving, especially on the relief streets; one of the best forms of traffic control.
12. Front-end car loading and modification of rear platform railings to permit the full use of the platform area at heavy loading points.
13. Limited parking time on heavy traffic streets and more effective police inspection—the duty of all police, not alone traffic officers.

RECOMMENDATIONS FOR FUTURE DEVELOPMENT

These include:

1. Covered prepayment loading terminals alongside the factory exit gates, with selective berthing for different routes.

2. Underground passageway under Woodward Avenue to the loading terminals from the approximate center of gravity of the factory workers.

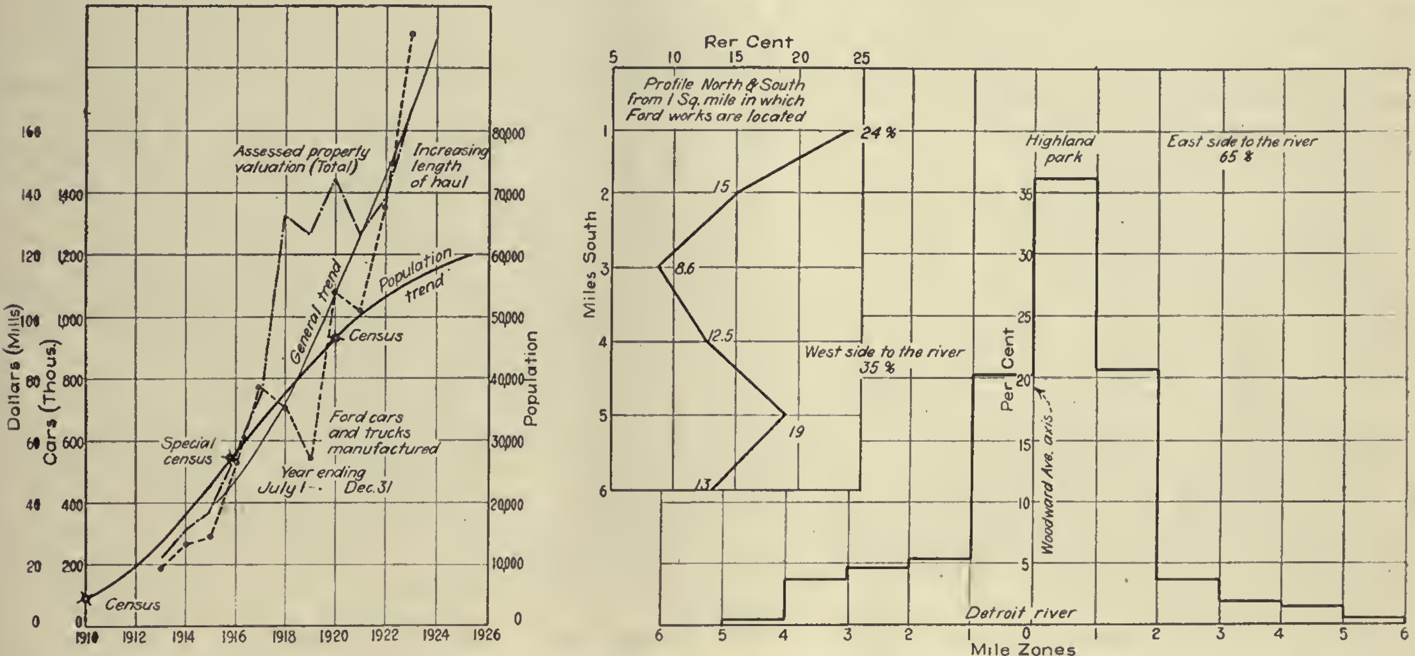
3. Terminal building opposite the factory with passenger loading terminal in the rear, also an interurban terminal accommodating passengers and freight, and a motor bus terminal to prevent the present overlapping traffic through the congested center.

4. Certain steam railroad grade separations to secure relief of main arteries.

5. Day-storage for business automobiles.

6. Closer co-operation in city and district planning to secure most efficient city development and avoid wasteful expenditures and duplications of facilities.

Mr. Bibbins points out that detour streets and prepayment loading stations stand out as the most important need. He also believes that there is opportunity for valuable concession terminal property which will be self-supporting commercially, will properly develop the valuable car-yard frontage on Woodward Avenue and will bring to one point, off the main highway, all facilities for transit, interurban and motor bus. Eventually such a terminal would be in a position to connect most efficiently with rapid transit, both local and through, and also with interurban routes.



Left—Chart Showing Growth of Industry, Property Valuation and Population of Highland Park, Detroit. Right—Distribution of Street Railway Traffic, Originating in Highland Park, Based on Figures from the 1913 Parsons Report

MORE RAPID CAR LOADING POSSIBLE

In developing these suggestions Mr. Bibbins makes some interesting observations on car and bus operations. Commenting on the speed of loading the street cars, he says, in part:

> No adequate facilities are available for speed and facility in loading and unloading the heavy traffic in the vicinity of the Ford Motor Works. Typical observations show that the average cars, even when coming into the terminal empty, do not load passengers faster than about one second per passenger, which seems to be the average rate at which fare-box collection can be maintained. When the platforms are full and aisles filling up, about one and one-half or two seconds per passenger are required. This is altogether too slow for such important traffic loading points and results from a combination of circumstances such as: No prepayment of fare, no front door loading by special collectors, fixed handrail obstruction on rear platform, one-half of rear door kept closed, no raised platforms to eliminate one step, no special car berths for certain routes, no signing for these special berths, interference of car movements of various routes.
>
> Of course, the absence of prepayment inclosures is the greatest source of slow loading in this district. They should cut the loading time in one-half if not one-third and thus make it possible to increase the number of cars on the trunk lines, provided the police signal control at the key crossings is adjusted to conform reasonably thereto.
>
> There is no reason at the present time why street collectors could not be used with great advantage in order to enable cars to load at both ends, especially at the heavy Woodward Avenue loading points and in Manchester Avenue. This would probably increase the speed of loading 20 per cent if not more. The difficulty often cited as an objection to the plan, of accurate accounting between receipts of various routes, can readily be overcome by determining occasionally a fixed distribution of revenue based on counts taken on typical days. The front-end collectors are also of considerable assistance to the terminal inspectors in clearing the way for the rapid exit of loaded cars.
>
> The fixed hand railings of the rear platform of the Detroit cars were put in to separate passengers boarding and alighting by the rear platform. While this is advantageous in the mid-day operations where the traffic is not heavy, it is a decided disadvantage at points where all the traffic is in one direction, especially loading. The actual standing capacity of the platform is the most important part of the rapid loading feature, as the platform is simply a reservoir designed to accommodate a maximum number of people before they pass the fare box. On modern large cars, as many as twenty-five people can be assembled on the rear platform awaiting fare payment. This means that a carload can be put aboard and the car sent away on its trip at least twelve seconds sooner than if only half the platform were available. The objection that some passengers might sneak by the fare box without paying is believed to be exaggerated, and even at its worst, represents a loss which will be very small compared with the total cost of operating and fixed charges on the total equipment delayed by slow loading.
>
> In many cities, the difficulty is solved by hinging the hand railing at the fare box so that it can be dropped down to make the entire platform available for standees. Both rear platform doors can then be opened for boarding.

SPEED OF CARS AND JITNEYS

On this point Mr. Bibbins says that records were made of the speed of the Woodward Avenue cars through the Highland Park district during rush and non-rush hours. It was found that the northbound speed was fairly constant, with an average non-rush hour speed of 9½ m.p.h., sagging only slightly to 9 m.p.h. during rush-hour periods between certain points, due no doubt to increased loading. Southbound results were quite different, and the speed was found to drop nearly 50 per cent between 1 p.m. and 4:30 p.m. through the loading territory as far as Gerald Avenue to an average of from 4 m.p.h. to 6 m.p.h. rush. South of Gerald Avenue high speed is maintained of from 15 to 16 m.p.h. On through movement the average southbound speed was from 9 to 10 m.p.h.

Under present conditions of loading, and counting trailers as cars, an average headway of thirty-one seconds was maintained southbound during the maximum hour of from 3:30 to 4:30 p.m., and a minimum headway of twenty seconds from 3:45 to 3:50 p.m. This indicates that a thirty-second headway is about the practical limit under present loading conditions. On the assumption of 100 passengers maximum per car, this would mean a line capacity of 12,000 passengers per hour out of any terminal point with single cars, or 24,000 per hour with two-car trains.

On their trip to Detroit the cars make from five to ten stops per mile, due to the constant interchange of passengers. With stops of thirty seconds, 1,000 ft. apart or 5.3 stops to the mile, approximately seventeen minutes of the run from Detroit to Highland Park is consumed in stops. At 8½ m.p.h. schedule speed, the 6½-mile run should consume about forty-six minutes. This means that more than one-third of the street car schedule time is consumed in stops, or over half of the actual running time.

The "de luxe jitneys" are giving a headway throughout the afternoon nearly equal to the average rush headway of the street cars (including trailers), but they carry only seven pay passengers against ten times or more per street car and twenty or more for a two-car train. General observation indicates that the passenger turnover on these jitney buses is such that they carry about ten passengers per trip, except during the light hours. On one-minute headway there would be during a day of eighteen hours a total carrying capacity in excess of 10,000 passengers, and with rush extras probably 12,000 passengers or more. But this traffic of 12,000 passengers is practically the line capacity per hour of a double-track single-car trolley line operating on a thirty-second headway.

The jitneys, however, make a much faster scheduled speed. This is the principal reason for their existence. On an average one-way trip from Detroit to Highland Park they make from five to seven stops, or about one stop per mile exclusive of traffic stops. If this stop takes only thirty seconds only 3.3 minutes are required for stops out of a run of perhaps twenty minutes.

It is a question what conditions would prevail if this service was rendered by large buses, providing say twenty to forty seats per bus. Such buses would probably have to stop much more frequently to accommodate the larger number of interchanging passengers, like the street cars, which already have limited stops, and as the rate of acceleration, braking and running would probably be less than the jitney bus, the use of the larger bus unit would probably defeat in considerable measure the purposes of the faster service. The only remedy for this condition would be to reduce the number of stops, which again would detract considerably from the facility of the present unlimited stop jitney service. This is clearly an economic question requiring further study.

The importance of police signal control is emphasized. For in effect, the line capacity and headway is limited directly by two main factors: (1) Duration and frequency of signals, and (2) loading speed at terminals or heavy points, other conditions being the same.

A BROAD APPROACH TO THE TRAFFIC PROBLEM RECOMMENDED

In discussing the method of approaching the problem Mr. Bibbins' report lays great stress on the need of securing a proper relation between the several factors involved. In other words, he early reached the conclusion that a solution of the traffic problems of Highland Park should not be attempted without regard to that city's physical, traffic, and community relations to the larger city of Detroit. This means that it is necessary to bear in mind Detroit's future rapid transit program, the municipalization of its surface railways, the railroad development program under way, including the city's grade separation program, and the tremendous development of commercial activity along Woodward Avenue. Fortunately, a broad solution, both for present and future, which will harmonize all of these interests, is practicable.

Another important approach to the problem is to secure the intimate co-operation of various agencies already at work on the problems involved.

These agencies are the municipal governments, the Detroit City Planning Commission, the Detroit Department of Street Railways, the Detroit Rapid Transit Commission, the Grade Separation Commission, the Ford Motor Works and various civic and commercial bodies. That this plan of co-operation has not been fully developed in the past in the formulation of transportation development programs is considered evident by the failure of or opposition to many plans locally developed, good in themselves but not best fitting into the general needs of the entire community.

Mr. Bibbins reports that the problem of the Highland Park District is one of a magnitude and complexity quite equal to that arising in industrial cities of several million inhabitants and with a concentrated traffic movement at one point perhaps exceeding in total that of any other point in the country. It is a good example to the transportation industry of what may happen in the development of sub-centers—so greatly to be desired in spreading our cities—when adequate planning is not made to forestall future demands on the street and rail transport systems. It emphasizes, it is believed, the fact that neglect of the transportation features of city planning will inevitably become a matter of grave concern and cost to the traction and other utility service.

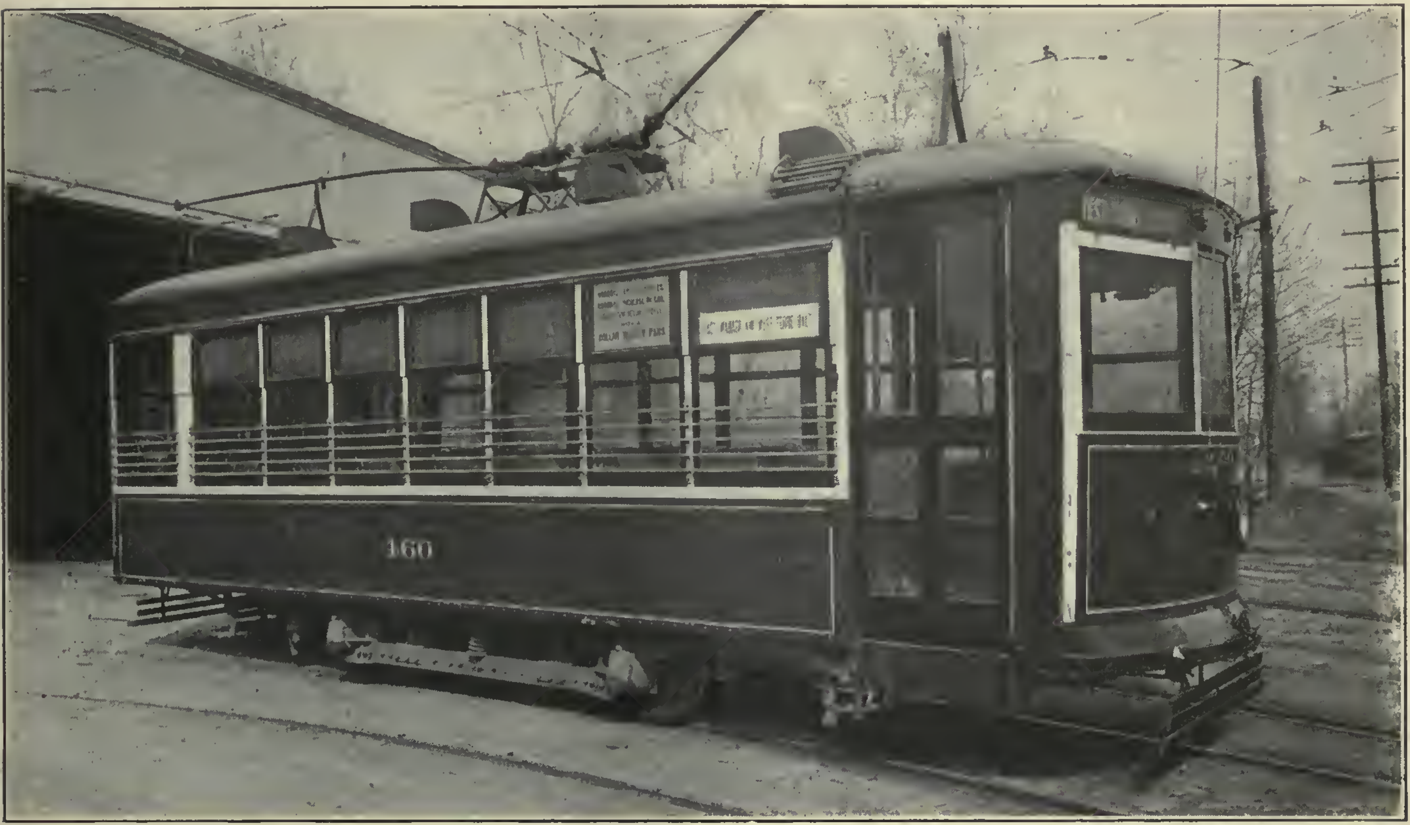
One-Man Car Facts Told in Augusta

A BOOKLET of twenty-four pages has been prepared by the Augusta-Aiken Railway & Electric Corporation addressed to the citizens of Augusta, informing them of the new system of transportation (one-man car) and facts of value regarding it. The booklet contains twelve letters explaining in detail the features of the safety car. Its safety, speed and comfort are made the subject of one letter, destination signs and numbers of another and its symmetry and beauty of a third. Included in the pamphlet is an editorial on the one-man safety car by E. M. Walker of Terre Haute, Ind. The pamphlet will also be found useful for its bits of advice and pertinent facts about the use of "your auto."

Experience as to Life of Birney Car

Five-Year Record in Terre Haute Shows that the Light-Weight Birney Car Has Given a Good Account of Itself and that It Is Good for at Least Another Five Years of Service

By E. M. Walker
General Manager Terre Haute Traction & Light Company



Appearance of Five-Year-Old, 13,750-Lb. Birney Safety Car After Going Through Forty-nine Accidents and Operating 205,000 Miles

IT IS now nearly seven years since the first Birney safety car was placed in operation and therefore much more is known as to its sturdiness and durability than was surmised at the time of the innovation.

According to the records the honor of placing the first Birney safety car in operation must be given to Everett, Wash., where the first car of this type was placed in regular service on Oct. 23, 1916, and has been running ever since. This was followed after only a few days by another car built at the same time which was placed in operation on the city lines at Seattle. Following these two by only a few weeks several Birney cars built at the same time were placed in operation in Fort Worth, Tex.

The first criticism heard after the innovation was made was directed to the fact that the car was too light in weight and would not stand up under the rigid requirements of average street car service. The standards as to weight have been considerably increased since the building of these first cars, as they weighed in the neighborhood of 10,000 lb. Also, with the increase in weight there has been an increase in the seating capacity and naturally a little increase in the size of the car. As these first cars are still in regular operation it must be assumed that the criticism which was directed against the lightness of the car and which predicted a short life has long since fallen to the ground.

The following notes deal with a car built in 1918 for the city lines in Terre Haute, Ind., and by that time the weight of the standard Birney car had been increased to 13,750 lb. The car was one of a lot of thirty, which was, it is believed, the largest order of Birney cars up to that time for a single city. The car about which the following details are recounted was selected at random. At the time the idea of putting the biography of a car on paper was first conceived this particular car happened to be in the shop for minor repairs. It had but a few months before been repainted and looked as though it was still fresh from the paint shop, although it had been on the street for several months since the painting. Hence it made a good subject for a picture.

Car No. 460, shown in the illustration, was purchased in the summer of 1918 and was, as stated, one of a lot of thirty. It was received in Terre Haute during the latter part of November and was first placed in regular service on Dec. 4, 1918. Briefly, its history since that time has been as follows:

Since Dec. 4, 1918, and up to Aug. 31, 1923, it has run 205,389 miles. During this period, or a total of 1.366 days, the car has been out of service 246 days or 18 per cent. On March 2, 1920, it came out of the paint shop after having been retouched and revarnished with one coat of varnish. It was again put through the paint shop in January, 1921, coming out on Jan. 15, after retouching and receiving one coat of varnish. It was again put through the paint shop in October, 1922, when it was completely gone over with one coat of enamel and one coat of varnish. The photograph shown herewith was taken early in April, 1923.

During the period covered the accident record was:

	1919	1920	1921	1922	1923
January	2	0	0	0	1
February	2	0	1	1	0
March	2	0	0	3	4
April	2	1	1	0	1
May	0	2	0	0	0
June	1	2	1	2	1
July	0	1	1	1	0
August	0	0	0	0	0
September	4	2	0	1	..
October	3	0	0	0	..
November	1	1	0	1	..
December	1	1	1	0	..

Of the accidents listed not one was of very serious consequence, but the list shows that all were reported. Analysis of the accidents shows that there were thirty-five collisions with automobiles, two accidents to persons not passengers and twelve collisions with other cars, making a total of forty-nine accidents. The number of accidents with which this car was concerned works out at one accident for each 4,191 miles operated. This is not so good a record as the general average for all the cars on the city system at Terre Haute. In 1921 the car-miles per accident on the city system were 4,748; in 1922 the average of car-miles per accident had increased to 5,546; and in 1923 for the first seven months the average figure has risen to 6,008. The above historical record of the car and the detailed statement of accidents in which it has been involved, taken into consideration with a study of the illustration, will show that the car has given a good account of itself.

Of course, in the case of any piece of rolling stock the first consideration is the economic balance between its cost and length of its useful life and its earning capacity. Reverting again to the often expressed fear that the car when originally built was too light to last long enough to pay for itself, it would seem that a glance at its actual performance would readily dispose of this misgiving.

The car was built, as stated, in the fall of 1918 and cost approximately $5,700. It has earned gross through the forty-five months in which it has been operated approximately $45,000, and its net earnings from operation have been approximately $18,500, this being the amount left after the payment of all operating expenses, including general expenses; and represents what is left with which to pay its own first cost, taxes, interest and so forth. If called upon to give a minimum estimate of the duration of its useful life we should say without hesitation that it is not by any means half gone. Therefore, it was felt that the accompaning facts and figures might be an interesting contribution in justification of the designers and builders and early operators of the light-weight Birney safety car.

Commissioner Asks Public Co-operation in Getting Accident Witnesses

IN A recent handbill, Harry Engle, Street Railway Commissioner of the city of Youngstown, Ohio, draws attention to the fact that under the service-at-cost plan in effect there the public has a direct interest in helping to reduce the large sum which the Youngstown Municipal Railway pays annually for claims. After showing that something between 10 and 12 cents out of every dollar of gross is being paid for damages, he says:

> You will readily appreciate what the effect would be on the fare situation if we could in some way cut down on the cost of these claims.
>
> It goes without saying that the company must take the money you pay in fares and from it pay for all damages to person and property which is caused by the negligence of the employees of the company. Furthermore, it will have to pay out further large sums for claims, even when no employee is negligent, unless it has the full facts of the accidents with which to protect the car riders' pocketbooks.
>
> When you see an accident you should give your name and address to the operator or conductor of the car involved. Then the company can readily learn just how the accident happened and who, if anybody, was careless or negligent.
>
> On the other hand, when you see an accident which is the fault of some one other than the operator co-operate by giving your name and address to the street car men and thus enable the company to learn the true facts from you. You then make it possible for the company to defend against a wrongful claim for damages, which, if paid, is paid for with your money.

Voltage Control and Ventilation Features of New San Francisco Converters

THE Market Street Railway of San Francisco has ordered two additional synchronous converters for its substation in the city. One of the new machines will have a 3,000-kw. rating and the other will be rated at 2,000 kw. This material increase of capacity has been necessitated by the general growth of street railway traffic in the congested downtown districts of San Francisco and in the residential section known as the Richmond district. The same departures from previous design which were specified when a new substation was built two years ago will be continued in the new machines. The chief departure was the use of means for voltage control by varying, under any load condition, the number of primary turns in the transformers.

The larger machine will be installed in what is termed "the downtown substation" (described in ELECTRIC RAILWAY JOURNAL for Aug. 20, 1921, page 269). This station was originally equipped with two 2,000-kw. converters; the added machine will therefore bring the rated capacity up to 7,000 kw.

The 3,000-kw. machine will be built for directed ventilation and will therefore avoid the usual difficulty in cooling such machines in substations on closely built-up property. This is said to be the first converter for railway service to be so equipped. The air passages through the machine will be so arranged as to take air into the armature from the room at both the collector and commutator ends and to blow it out radially around the pole structure into air ducts by which it will be carried away. This will avoid any inclosure of parts requiring inspection and attention and will be preferable in this respect to the usual axially directed ventilation.

The 2,000-kw. machine ordered at the same time will be installed in the Eighth Avenue substation to take care of increasing travel in the Richmond district. This will also be equipped with means of voltage control similar to that referred to above, but will not have directed ventilation.

The 3,000-kw. machine is being built by the Westinghouse Electric & Manufacturing Company, which supplied the original equipment in the downtown substation. The other machine is being made by the General Electric Company, which built the existing equipment in the Eighth Avenue station.

The extensions are being carried out under the direction of Ford, Bacon & Davis, Inc., consulting engineers.

Selling Street Car Rides in Dallas

Co-operation, Better Public Relationship, Together with "Smiling Service," Have Been the Outcome of the Recent Publicity Inaugurated by the Dallas Railway

By Z. E. Black

Manager Publicity Department, Dallas Chamber of Commerce

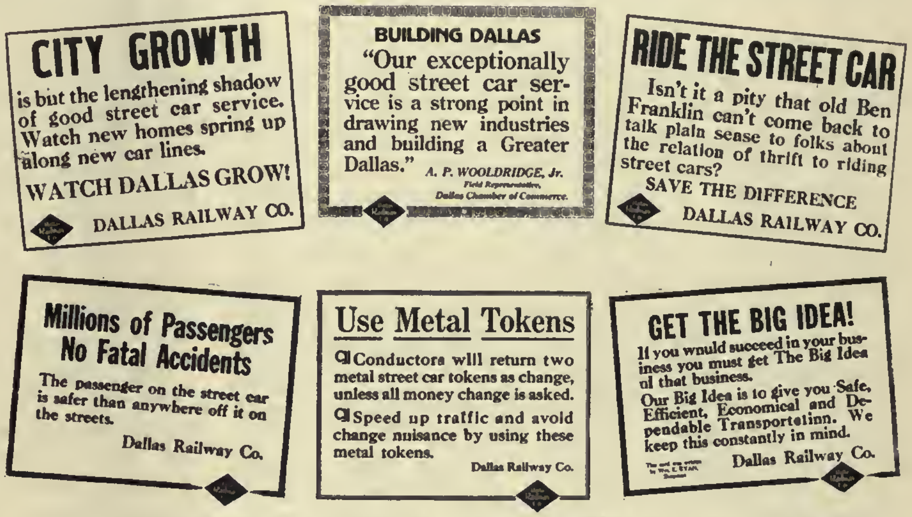
At a time when merchandising transportation is a foremost topic with street railway men, the case of Dallas is significant. In this city of 200,000 population a notable program of sales management by the street railway is being carried on. The task of merchandising transportation is being attacked from the same point of view as is used by department store sales managers.

A few years ago the Dallas Railway encountered severe hostility from the public. When the company asked anything from the city opposition invariably resulted. To remedy this condition a careful review of the situation indicated the necessity of an intensive program of selling the company to its employees and to the public. The first step was an analysis of service from the rider's point of view. This study of transportation service revealed many possibilities of improvement, and as rapidly as possible these were put into effect. In most cases the changes were not along the line of expensive additions to service or equipment, but along the line of public relations and methods of handling the public.

As a start it was assumed that the rider paid his fare to be carried from one point to another. Any service in addition to this ride he regarded as "extra service." A school for training platform men was established. In this school trainmen were taught how to give pleasing service. They were impressed with the necessity of having at all times a clean, pleasant personal appearance. This meant clean face and hands, properly cared for teeth, clean shirt and collar and an attractively kept uniform. Men were made to see that a cleanly shaved face was not only more comfortable to themselves but that it made a much better impression on their passengers.

In addition to teaching proper care of the person and the technique of giving service, special emphasis was placed on the finer human relationships that should enter into that service. Trainmen had earned a reputation of being uncivil. They were called "gruff, short-spoken and discourteous." Many of these complaints were justified. It was recognized that a smile is the best vehicle for pleasant personal relations. Cumbersome rules were eliminated and trainmen instructed to treat their passengers as they themselves would like to be treated if their positions were reversed. "Smiling service" became a byword among the employees. No effort was spared to impress them with the worthwhileness of a pleasant disposition. They were taught that a man's disposition is contagious; that the conductor who greets his passengers with a smile, thanks them for their fare and possibly adds a word pleasantly spoken, showing a friendly interest, receives in return the friendly co-operative interest of his passengers. On the other hand the man with a chip on his shoulder soon learns that the street car is the best place in the world to have it knocked off quickly.

Frequent meetings of employees are held in which the officials of the company instruct the men along the lines of selling service. A large portion of the program is usually given over to suggestions from the trainmen themselves about methods that they have found to be satisfactory.



CITY GROWTH
is but the lengthening shadow of good street car service. Watch new homes spring up along new car lines.
WATCH DALLAS GROW!
DALLAS RAILWAY CO.

BUILDING DALLAS
"Our exceptionally good street car service is a strong point in drawing new industries and building a Greater Dallas." A. P. WOOLDRIDGE, Jr.
Field Representative,
Dallas Chamber of Commerce.

RIDE THE STREET CAR
Isn't it a pity that old Ben Franklin can't come back to talk plain sense to folks about the relation of thrift to riding street cars?
SAVE THE DIFFERENCE
DALLAS RAILWAY CO.

Millions of Passengers
No Fatal Accidents
The passenger on the street car is safer than anywhere off it on the streets.
Dallas Railway Co.

Use Metal Tokens
¶ Conductors will return two metal street car tokens as change, unless all money change is asked.
¶ Speed up traffic and avoid change nuisance by using these metal tokens.
Dallas Railway Co.

GET THE BIG IDEA!
If you would succeed in your business you must get The Big Idea of that business.
Our Big Idea is to give you Safe, Efficient, Economical and Dependable Transportation. We keep this constantly in mind.
Dallas Railway Co.

The Dallas Railway Has Found Car Cards Very Effective. These Are Some that Have Been Used

Along with the grading up of service from within, a campaign of publicity was carried on. This consisted of newspaper advertising and cards displayed in the front and rear vestibules of street cars. The car card was found to be the most effective advertising medium. These cards were prepared with great care and passed the scrutiny of a large number of individuals before they were used. A standing offer of $5 for each piece of car card copy accepted from an employee created a great deal of interest in the organization and produced some valuable advertising material. The value of the cards as a public advertisement was at once demonstrated. Another and even more valuable result, which at first had not been considered, was the effect on the trainmen themselves. They formed the habit of watching for these cards. They felt it to be their duty to make the statement of the cards come true in service. A few general principles in the preparation of cards were established. The card used in Dallas Railway cars is 11x14 in. The type used is always arranged for easy reading the whole length of the car. Statements are boiled down to the fewest possible simple words. No negative commands are given. Instead of saying "Please keep your shoes off the seat," a card read: "Women appreciate the thoughtfulness of men who keep their shoes off our seats." The point went home. Direct suggestion is always used. Epigrammatic statements that passengers will remember prevail. Human interest is always sought. Frequently the advertising is of such nature as to boost the city without direct reference to the company. This indirect advertising has been especially valuable:

FIRST CAMPAIGN OF PERSONAL SERVICE

One of the first of the series of advertisements on the cars was written to promote relationships between the trainmen and their passengers. This card contained the photograph of the oldest trainman in order of seniority. It was headed "Personal Service," and read: "Each trainman wishes to give you the kind of service his best friend deserves. He, personally, wants you to be proud of Dallas and its street car service." Under the photograph on this card were the following explanatory words: "Mr. Trotter is the oldest trainman in order of seniority. He has devoted twenty-seven years continuous application in the upbuilding of our personal service." Another card followed this with the heading "Friendly Service": "All trainmen will go out of their way to give real service. They are proud of their work for a greater and better Dallas." These cards attracted much favorable comment, and the one on which the trainman's photograph appeared called forth editorial comment from two newspapers—and also news stories. In this connection newspaper reporters were encouraged to obtain interviews from prominent visitors who complimented the street car service. Carrying out the idea of personal service pleasingly rendered, prepared interviews from visitors are given the newspapers. These are always published.

Along the line of associating street car service with city pride, a series of advertisements, of which the following are examples, appeared in the newspapers and on the cars: "Building Dallas—Our exceptionally good street car service is a strong point in drawing new industries and building a Greater Dallas." This was signed by a prominent business man. This card was followed by: "City growth is but the lengthening shadow of good street car service. Watch new homes spring up along new car lines." This thought was repeated in a card: "Homes spring up wherever street car service goes. Vacant places give way to homes. It is the lifeblood of city growth."

The series of civic advertisements closed with one suggested by the Dallas Chamber of Commerce: "What are you doing to make Dallas forge ahead? Civil pride is the result of each citizen doing individually what he wants done collectively. Are you doing your part?"

When the local real estate board conducted an "Own Your Own Home Week" the company advertised widely the importance of good street car service as an element in home ownership. People were made to realize that their street car service meant much to the city's welfare. "Own your own home. Buy a lot now near the route of one of the new street car lines. Prices will double when service starts. We are building up Dallas."

The publicity manager of the Dallas Railway frequently addresses noon-day luncheon clubs and civic organizations. The company is proud of its organization and service and the speaker unhesitatingly says so. Aggressive publicity policies are pursued and no effort is made to avoid public discussion. In fact, it is encouraged.

SAVE THE DIFFERENCE

The Dallas Railway originated, and has employed, the slogan, "Ride the Street Car and Save the Difference," for more than two years. This has become a byword in Dallas. It is kept alive by continual repetition in advertising. During the State Fair last year this slogan was painted on twelve of the largest and most prominent illuminated billboards in the city. These billboards were the most desirable to be had, and the billboard service for thirty days cost $1,000. By this means the slogan was hammered home so effectively that it has been kept alive with a very small amount of paid advertising.

Recognizing the direct competition between the privately owned automobiles and street car, the company determined to make its fight solely on the economy effected by its service. A long series of related advertisements followed in which the economy of the street car was played up. Examples of this advertising follow:

"*Ride the Street Car*—Isn't it a pity that old Ben Franklin can't come back to talk plain sense to folks about the relation of thrift to riding street cars? Save the difference."

"*Figure It Yourself*—The cost of one automobile tire will pay for your street car rides all winter. Ride in the street car. Save the difference."

"How many street car rides in a gallon of gasoline? Save the difference."

"*Save the Difference*—Up town and back for a few cents. No worry about costs and repairs."

When the Southwest Automobile Show opened in Dallas liberal display advertising space in the automobile section of the local papers was utilized for aggressive advertising like: "Some depreciation! What can you get for the new car after driving it a few days? Your loss, on the average car, will take you to and from town daily on the street car for more than ten years. Figure it yourself." The effect of this ad was so striking and occasioned so much comment that the Automobile Trades Association seriously considered asking the company to desist playing up so strongly the comparative elements. Several automobile dealers asked the company to have mercy and not discourage car ownership. Connection was made with the local Thrift Week campaign of the Y. M. C. A. and a permanent arrangement made whereby the company would work with them along the lines of thrift advertising. Examples of this follow:

THRIFTGRAMS

"The Dallas Thrift Committee will use this space regularly for valuable thrift messages. 'Thrift broadens your grin.' Let's all smile together."

"Every little bit added to what you have makes just a little bit more. Ride the street car. Save the difference."

"Thrift Leads Surely to Success." "Thrifty people ride the street cars and save the difference."

The legitimate use for the automobile for pleasure purposes is always admitted. The only criticism in the company's publicity was directed against the unwarranted use of the private automobile as a means of going to and from work. The following cards are along this line:

"*Save Your Auto*—Are you grinding the life out of your car by driving it to work? Use your car for pleasure trips and the saving will surprise you. Ride the street car. Save the difference."

"*Save Your Auto*—No blowouts, no punctures, no parking worries, no danger of accidents, no thieves to guard against when you ride in the street car. Six cents pays the whole bill."

"*Why Not Let the Motorman Be Your Chauffeur?*—You can avoid all parking worry, responsibility, expense and petty annoyances that come from driving your car down town."

The advertising and publicity promoting the use of the street car instead of the automobile is believed to have been worth many times its cost. Passenger receipts have increased materially, and on every hand people have the habit of saying, "Ride the street car and save the difference." The cost of this type of publicity is surprisingly small. Dallas has four daily newspapers, in each of which the company contracted for a minimum of 10,000 lines of display advertising space a year. This cost is about $8,000. Car cards are changed once each week in the cars so that each card is displayed two weeks. For 300 cards of simple one color printed matter, without illustration, the cost is $9.25. Where two colors are used, the cost is $11.75. Where illustrations are used, the cost will depend upon the work of the artist and the engraving. These cards range in cost from $25 to $190 for 300 cards. The most expensive card ($190) was a beautiful eight-color job in which children were shown boarding a street car. This card appeared the next day after the Dallas Railway had given free transportation, on Children's Day at the State Fair, to more than 200,000 children, without a single accident of any sort. The card read: "Parents, you may safely intrust your children of school age to the street car."

EDITORIAL COMMENT BY NEWSPAPERS

All daily newspapers carried complete stories and editorial comment about the exceptional safety record of the Dallas Railway.

Unfavorable publicity is kept out of the newspapers by giving them accurate reports of happenings. Formerly it was always said that "the street car collided with the automobile, etc." Now the publicity department has an arrangement with all newspapers that they will publish no street railway news without first obtaining verification from the company. Reports of all accidents are immediately given to the newspapers before they ask for it. This co-operation with the newspapers and the willingness to give them facts have come much to promote their friendly attitude toward the company.

The Dallas Railway believes in advertising and spends $15,000 annually for this purpose, exclusive of salaries. C. J. Crampton handles publicity for the company. Mr. Crampton is superintendent of the efficiency department and his duties include interdepartmental relationships, public relations, safety and supervision of employment and training. His work is that of a personal representative of Richard Meriwether, vice-president and general manager. He knows street car operation in a practical way. His work is not primarily publicity, but includes actual supervision of service conditions. Probably one of the most important elements in the success of the public relations program of the Dallas Railway has been that its publicity manager is capable of keeping the service up to the character that is advertised. He has brought about a high degree of co-operation between departments and employees and has sold the company to itself. The platform men, in turn, sold the car service to the public. With characteristic Southwestern egotism the Dallasite tells the world that the street car men in his town are the finest lot he has ever seen. He likes the company and its service. To prove this, when a candidate for Mayor in the last city election made his race almost solely on the issue of reducing street car fares to 5 cents this candidate received 508 votes and his opponents 19,657 votes.

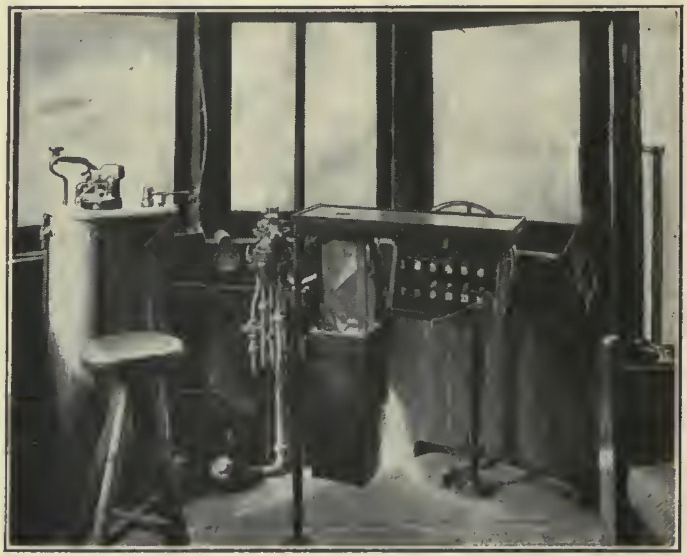
Evidently Dallas likes the street railway company and the service it renders. Pleasant public relations make strong friends and stimulate traffic when the public realizes what "Save the difference" means.

Fare Collection on One-Man Interurban

Hat Checks Used in Conjunction with the Pay-Enter Plan Are Deposited in a Cleveland Fare Box When Passenger Leaves Car

THE method of fare collection on the Saanich interurban line, British Columbia Electric Railway, Victoria, B. C., is interesting because one-man operation has been recently inaugurated. There are thirty-one stations, Victoria to Deep Bay inclusive, divided into eleven zones. Identical fares are charged to and from all stations in any zone.

Hat checks are used which carry on both sides the number of the zone to which the passenger has paid fare. Tickets are sold on the cars only. Passengers board and alight at the front end of the car. On boarding the car, the passenger ascertains from the operator the amount of the fare and places the exact amount in a Cleveland fare box. The operator then gives the passenger a hat check punched with the number of the station where the passenger boarded the car. This check is retained by the passenger until he has arrived at his destination. When leaving the car he exhibits the check to the operator, who can tell at a glance from the large zone number that the passenger is not overriding, and then places the check in the Cleveland fare box.

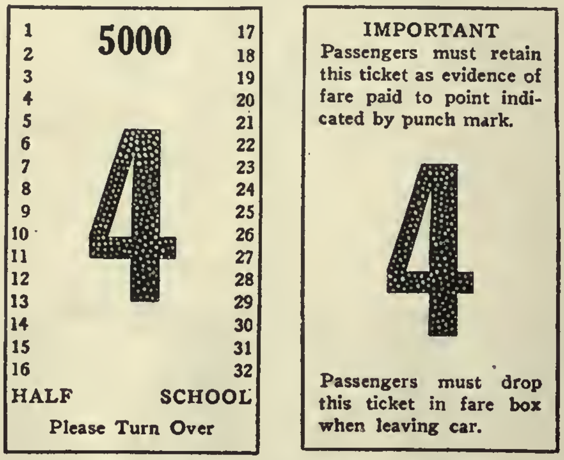


Zone Checks Are Carried in a Rack at the Right of the Operator

The fare box is attached to a vertical stanchion directly to the right of the operator's seat. Attached to the same stanchion over the top of the fare box and swinging with it is a change counter with a hole above the hopper of the box where the passengers deposit their fares. This board extends toward the right beyond the farebox, as shown in the accompanying illustration. From the underside of this counter is suspended a rack having twelve compartments to hold the zone checks. The latter are separated into eleven groups for the eleven different zones and are held in the rack in a manner similar to that customary in railroad ticket offices. A cover is provided for the ticket rack, which slides into the space immediately beneath the change counter, and which can be drawn down and locked so that the operator does not need to remove the zone checks each time he leaves the car.

The usual round-trip tickets have been withdrawn, also the ordinary commutation or settlers' tickets. There have been no increases in the ordinary one-way fares except in one or two instances, where an increase of 5 cents has been made.

Taking the place of the commutation tickets and for all who have occasion to make frequent use of the Saanich interurban, low-rate tickets are sold for $3 in books of eighty, the face value being $4. They can be used at all times, and in payment of any fare. If a passenger wishes to pay a 40-cent fare with these tickets he will deposit eight of them in the fare box.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
5000
4
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
HALF SCHOOL
Please Turn Over

IMPORTANT
Passengers must retain this ticket as evidence of fare paid to point indicated by punch mark.
4
Passengers must drop this ticket in fare box when leaving car.

Collecting Fares on One-Man Interurban

The hat check is deposited in the fare box as the passenger leaves the car. The large number indicates destination. The operator punches a small number to indicate the boarding point.

One-man operation has now been in effect for three months. There has been no difficulty in maintaining the efficiency and frequency of the service. No accidents have occurred and there have been no complaints.

English Railway Electrification Progress

ELECTRICITY will take the place of steam power on several hundred miles of railroad in the south of England and the Midland counties under the schemes being undertaken by the British railways. Two of the routes planned to be electrified, the work to commence immediately, are part of the South Eastern & Chatham system, says Consul-General R. P. Skinner in a report to the Department of Commerce. The lines from Charing Cross to Orpington (14½ miles) and Dartford (17¾ miles), and to Addiscombe and Hayes, are mentioned as the first, and will be followed by a second section comprising lines to Gillingham (36 miles), Tonbridge (30 miles) and Dorking (23 miles). On the London, Brighton & South Coast Railway work is proceeding on the line through Croydon to Coulsdon (14 miles) and Wallington, and is expected to be finished this year. Then will follow the change over from Coulsdon to Brighton, Brighton to Eastbourne (running east) and Worthing (running west).

Cement that Sets in Fifteen Hours

THE circumstances of the military situation during the World War at times required a cement which would set much more quickly than any theretofore used. In order to meet this need the French developed a material that hardened so rapidly that a good concrete platform for a heavy gun could be built in twenty-four hours. Because the utility of a quick-setting cement is perhaps greater to the street railways than to any other industry, this material is of special interest to them. If concrete for track foundation can be poured and the track used within a few hours, it will greatly facilitate the problems of construction and maintenance in city streets where railway traffic cannot be interrupted.

With this thought in mind the Boston Elevated Railway started correspondence about two years ago with the manufacturers of "Ciment Fondu." This is the product developed by the French for military purposes and is now made by the Société Anonymé des Chaux et Ciments de Lafarge du Teil, Marseilles, France. It is a lime aluminate differing from normal Portland cement in the small amount of silica present. Another point of difference is that it is prepared by actual fusion, not by mere clinkering. It is white in color and will harden with remarkable rapidity. The average composition is about as follows: Lime, 50 per cent; alumina, 40 per cent; silica, etc., 10 per cent.

In June, 1922, the railway was able to secure a small sample of this cement, which it then tested in a laboratory in comparison with Edison, Allentown and Atlas cement. These tests were in accordance with the specifications of the American Society for Testing Materials for 1921. More recently, in the spring of 1923, a shipment of five barrels of "Ciment Fondu" was received. A 25-lb. sample was sent to consulting chemists who made laboratory tests for hardening properties, strength, soundness and constancy in volume. Particular attention was paid to early strength. The results of the tensile test are shown in the accompanying table.

It will be observed that at three months the strength is somewhat better than at twenty-eight days, although it is still not up to the strength shown at earlier periods. According to the chemists' report, however, as long as the strength holds up to that average figure, the cement can be considered as very satisfactory.

CIMENT FONDU
TENSILE STRENGTH, 1 TO 3 MORTAR, IN POUNDS PER SQ.IN.

	Fifteen Hours	Twenty-Four Hours	Forty-Eight Hours	Four Days	Seven Days	Fourteen Days	Twenty-eight Days	Three Months
	302	360	393	457	472	500	413	469
	280	340	386	445	507	520	455	48
	315	372	375	482	478	490	433	460
Average	299	357	385	461	486	503	434	459

The cost of this cement to the Boston Elevated Railway was $4.91 per barrel, to which had to be added the customs duty of 26¼ cents per barrel and a freight charge of $1.37 per barrel, making a total cost of $6.54. This price, of course, is very much higher than that of domestic cement, which at the present time costs about $2.95 per barrel at Boston.

No practical tests of this cement in actual building construction or track foundation have yet been made. It is planned, however, to try out some of the latest shipment in this way during the coming months. The results of these tests will be told in the ELECTRIC RAILWAY JOURNAL from time to time as they are made.

Portable Substation with Outdoor Switching Equipment

550-Kw. Rotary Converter Can Be Operated from Either a 13,200-Volt or a 22,000-Volt Three-Phase Line

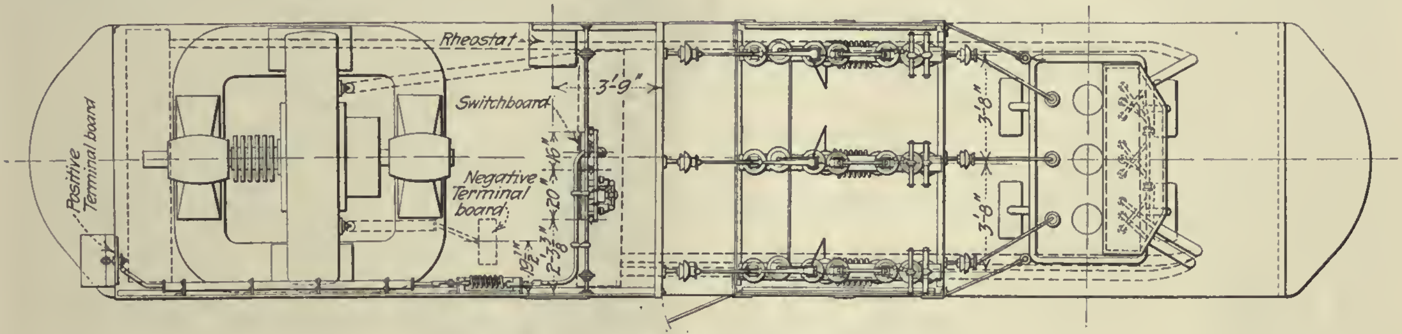
THE Milwaukee Electric Railway & Light Company has recently completed, in its Cold Springs shops, a portable substation of somewhat novel design, for use at various points on its lines where the voltage may be low due to abnormal conditions. The construction differs from that of the ordinary portable substation in that the housing covers only the rotary converter and the d.c. switchboard, the transformer and high-tension switching equipment being of the outdoor type.

The equipment is all mounted on a steel floor, which forms the body of a flat car. The three-phase transformer is arranged for operation on 13,200-volt and 25-cycle alternating current, which is standard for the company's transmission system. In order that the substation may be available for use on the system of the Milwaukee Northern Railway, an associated company, the transformer was designed so that the primary windings could be reconnected for use on its 22,000-volt system as well. The terminals for connection to the high-tension lines are supported on insulators mounted on the end of the converter compartment. From here the current goes through a combination three-pole lightning arrester, choke coil and disconnecting switch, which may be seen in the illustration in the open compartment of the substation. From here it goes to the high-tension terminals of the transformer, which is a 550-kw. Westinghouse three-phase-six-phase unit rated at 22,860/440 volts, 25 cycles. The low-tension leads are brought out from the transformer through a terminal box, which may be seen at the extreme end of the substation, thence going beneath the floor and to the a.c. terminals of the rotary converter.

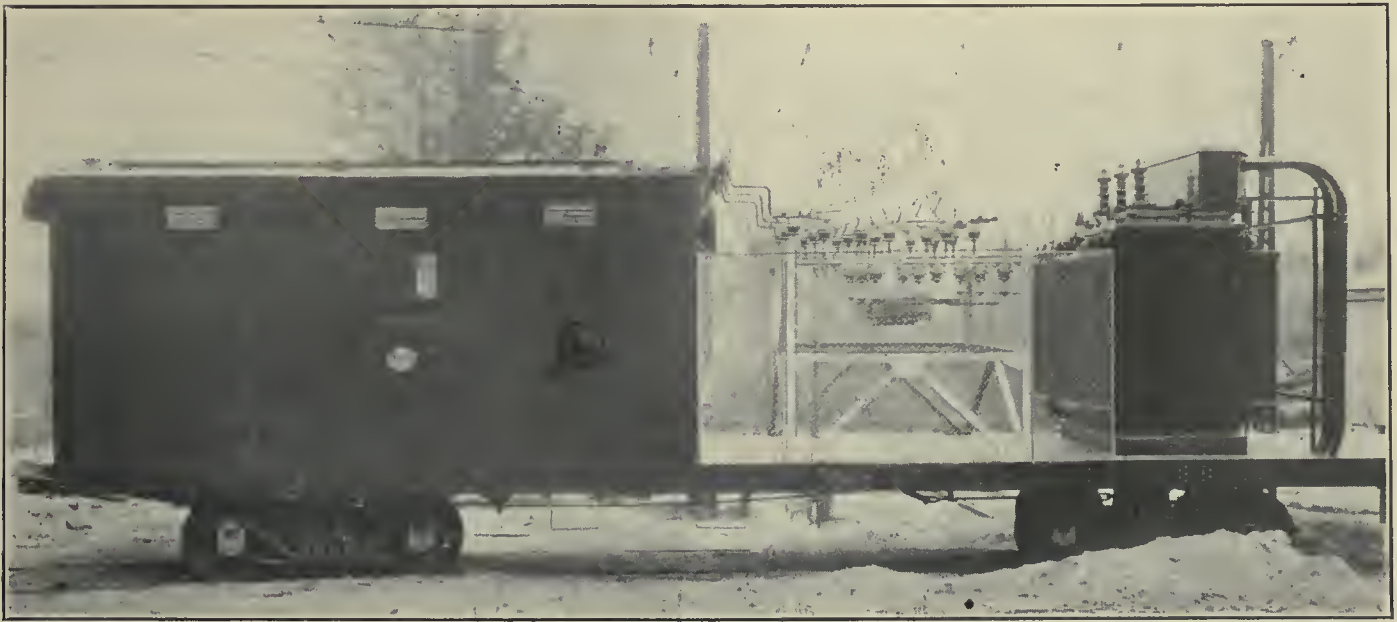
The converter is a 500-kw. six-phase machine which previously had been used in a permanent station. The unit is started at reduced voltage, a three-pole double-throw starting and running switch being provided on the a.c. side.

In order to prevent undue mechanical shock to the instruments on the switchboard, the d.c. control and feeder panel has been mounted on stanchions, which are provided with springs through which they are held to the floor. The d.c. positive lead is carried from the switchboard panel through a choke coil to a terminal board located at the extreme end of the converter compartment. This board is covered with a protection hood that may be seen at the extreme left of the illustration. The negative lead is carried from the converter through the floor to a terminal block located under the body.

The portable substation is being used at present at the terminal of one of the heavy street railway lines. It is expected that in the future the portable substation will be used on interurban lines for taking care of heavy loads due to special attractions which require more than the regular service. It will, of course, be available for such emergencies as may come from the failure of a substation.



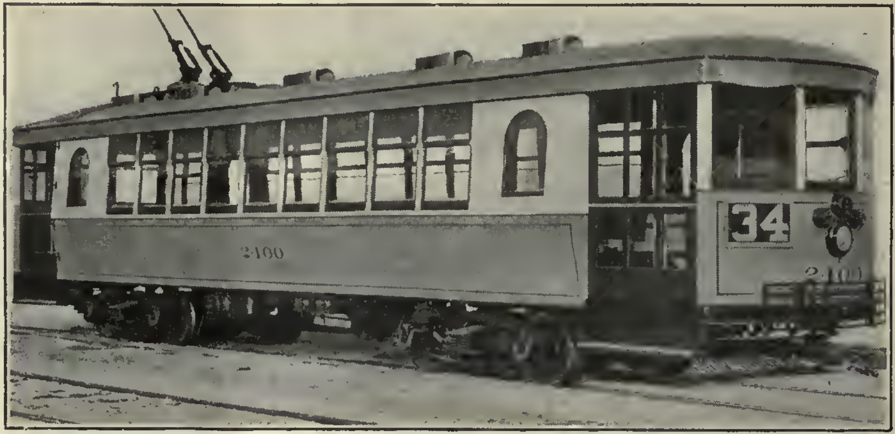
Floor Plan of New Milwaukee Portable Substation



Portable Substation with Outdoor Type Switching

New One-Man, Two-Man, Three-Man Cars

Multiple-Unit Control, Curved Sides, Arched Roof and Low-Level Platforms Are Features of Seventy-five New Single-End, Light-Weight Cars for Cincinnati



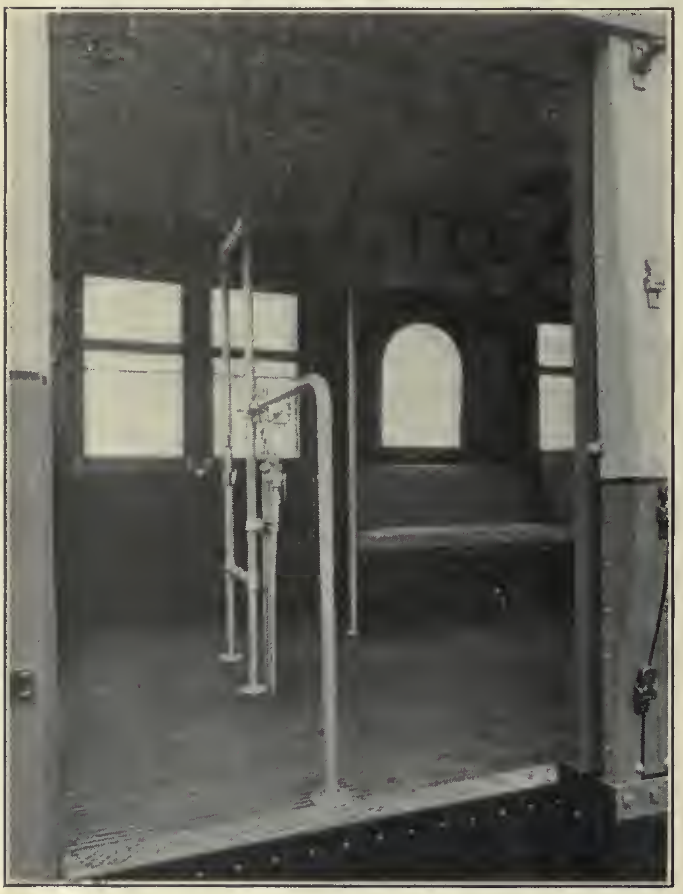
Latest Type One-Man, Two-Man Car Installed in Cincinnati

THREE possible methods of operation were contemplated in the design of the seventy-five new cars recently built by the Cincinnati Car Company for the Cincinnati Traction Company. They are single-end, light-weight cars ordered on July 14, 1922, as previously mentioned in the ELECTRIC RAILWAY JOURNAL, and are now in operation on five routes in Cincinnati, where they have proved to be popular with the public and also with the trainmen.

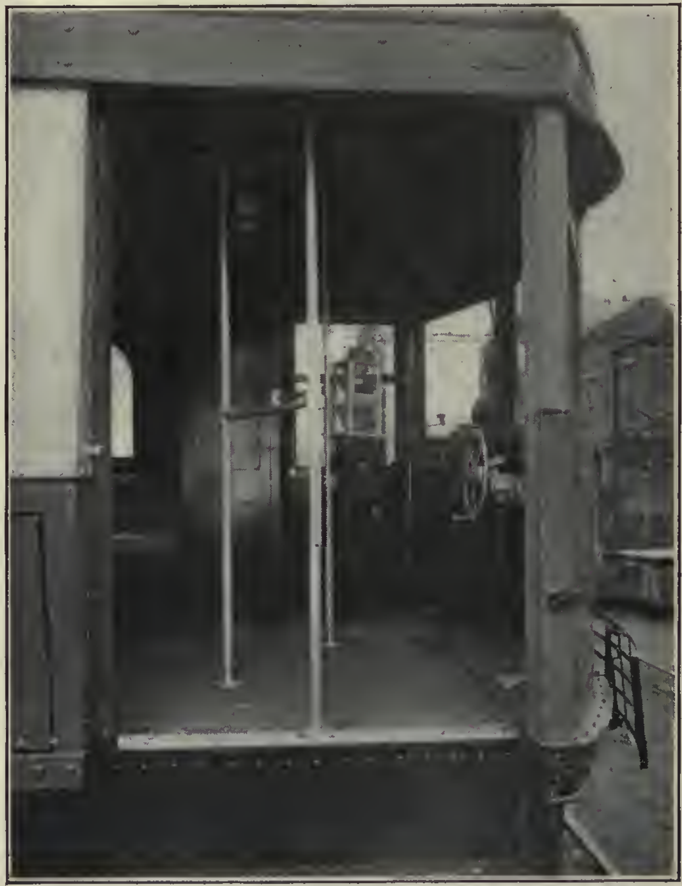
The new car may be operated as a single unit with either one man or two men. As Westinghouse HL multiple-unit control is used, it is also possible to couple two cars together in a train handled by three men. Cincinnati has hills which are both steep and long, but sufficient motor capacity is provided by four Westinghouse 510-A motors of 35 hp. each, so that the cars may be operated singly or in trains on any route in the city. On two routes where the new cars are now in service they are used as one-man cars and on the other three they are operated by two men.

Curved sides give the car an exterior appearance similar to the light-weight cars of the Kentucky Traction & Terminal Company, described in the ELECTRIC RAILWAY JOURNAL for June 3, 1922, and those of the City Railway of Dayton, described Oct. 18, 1922. It is thought that this design has practical advantages as well as merchandising value on account of its distinctive appearance. The greatest width being at the belt rail, there is a maximum space available for cross seats. Likelihood of side swipe is less when cars pass each other on uneven track, because the width is less where the swing is greatest.

Moreover, the shape affords increased lateral stiffness for the same reason that corrugated iron is stiffer than sheet iron. To give maximum rigidity at the corners four small arched windows are used in the side panels instead of the ordinary rectangular windows. This is feasible because these windows are never opened, the entrance and exit doors being of the sliding type



Arrangement of Stanchions and End Seats as Seen Through the 48-In. Opening of the Sliding Door



Exit and Entrance Passageways Are Separate. The Sign Is Illuminated by a Lamp Shining on Its Face which, when open, come between the window and the interior of the car.

Side posts are of wood and extend only from the letterboard to the belt rail. They are bolted above to an aluminum bracket casting, and are fastened at their lower ends by bolts through the belt rail, extending through small aluminum castings which fit on top of the belt rail and form seats for the lower ends of the side posts.

Stiffening ribs riveted to the side structure form part of the seat assembly by being attached to the side sheet at an angle corresponding to the slope of the seat back. The outside frame of the seat structure is made of cast aluminum alloy. There are eighteen cross seats and four longitudinal seats, giving a total seating capacity of forty-six. Longitudinal seats on the door side of the car are arranged for two persons each, while those on the opposite side seat three persons each. Seats are of the spring cushion and spring back type, 36 in. wide and rattan covered. The width of the aisle is 23 in.

The Interior of the Car Has a Pleasing, Roomy Appearance

The body of the car is of semi-steel construction and weighs 16,100 lb. The trucks weigh 8,200 lb. and the equipment 6,000 lb., making a total weight of 30,300 lb.

The arched roof is equipped with Garland ventilators. The headlining is ¼-in. Agasote painted white. Interior woodwork is cherry and trimmings are of polished bronze. The lower side sash are wood and are held in place by cast aluminum pilasters screwed to the outside of the posts. By removing these pilasters the sash may readily be taken out.

The height from the rail to the step is 16 in. and from the step to the platform 14 in., which is lower than on any car previously operated by the Cincinnati Traction Company. There is a 2½-in. ramp in the car floor, making the inside height in the clear 7 ft. 3 in.

Illumination of the destination sign at night is accomplished by an electric lamp set above the sign and shining on its face, as shown in an accompanying illustration. This is the standard practice in Cincinnati. It has been adopted because the middle front vestibule windows on the older type cars slide to the right, and there is insufficient room to locate an electric lamp behind a transparent sign. The interior of the car is lighted by 23-watt unshaded mill-type electric lamps.

Standard safety car devices are used, and the sliding doors already mentioned are operated by National pneumatic door engines. The door engines, however, do not control the steps, which are of the permanently fixed type. Door openings are 48 in. wide, and step treads are of aluminum.

PRINCIPAL DIMENSIONS OF NEW CINCINNATI CAR

Length over all	42 ft. 8 in.
Width over all	8 ft. 2 in.
Bolster centers, length	21 ft. 0 in.
Height, rail to trolley base	10 ft. 11$\frac{5}{16}$ in.
Trucks—Cincinnati passenger type archbar—wheelbase	5 ft. 4 in.
Wheels	26 in. cast iron

Drop-Forged Pull-Overs Used in Detroit

THE Department of Street Railways, Detroit, has adopted drop forgings for such portions of its overhead line material as are subjected to heavy strains and blows. This use of forgings was mentioned briefly in an article in ELECTRIC RAILWAY JOURNAL for May 19, page 846.

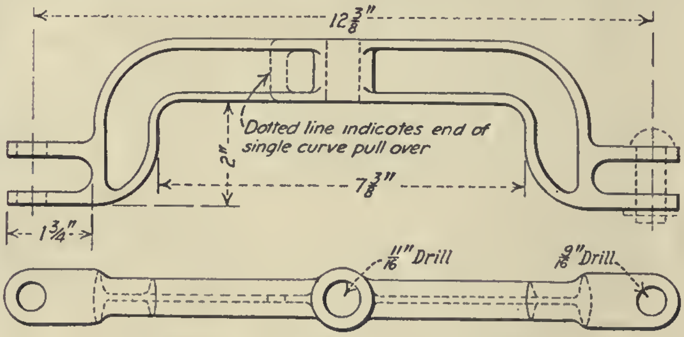
As an example of the type of hardware used, the pull-overs are illustrated. The hangers are made of H cross-section, with area sufficient to stand any ordinary strains encountered in service, the section being fluted so as to give a very light weight. The two forms, one a double-curve pull-over, as illustrated, and the single-curve pull-over, are similar in design, the difference being that the single-curve pull-over is cut off ¾ in. beyond the insulator bolt hole. The only machining required on these hangers is to drill the holes for the insulator bolt and for the pins by means of which the guy wires are attached.

The design of these pull-overs follows specification Df4d of the American Electric Railway Engineering Association. The material used for the pull-overs, the cotter bolts and cotter pins is carbon steel having a composition as follows:

Carbon	0.15-0.25 per cent
Manganese	0.40-0.80 per cent
Phosphorous	0.05 per cent maximum
Sulphur	0.05 per cent maximum

The minimum strength of the material composing these pull-overs is specified as being 60,000 lb. per square inch.

The steel is protected by galvanizing or sherardizing according to the American Railway Engineering Association standard specification Df2b.



The Pull-Overs Are Drop Forged to Size

Although the Department of Street Railways adopted this type of drop-forged line material on account of its greater strength and freedom from breakage, it has been found that a considerable saving can be made in the cost over that from the ordinary malleable-iron castings, provided the parts are purchased in large quantities, sufficient to justify the expense of making dies.

Association News & Discussions

Operating Men of Iowa Meet at Davenport

Motor and Gear Development, Maintenance Methods and Operating Problems Among Topics Discussed—Tests of Rail Joints Described

The Iowa Electric Railway Association's summer meeting was held at Davenport, Sept. 6 and 7, where the members were entertained as guests of the Tri-City Railway. Educational trips were provided for the delegates through that company's shops and to points of interest in the immediate vicinity, including the machine shops of the Rock Island arsenal. While the papers presented were on subjects of interest to operating men in all departments of the railway industry, the discussion pertained largely to the mechanical departments. Morning sessions were held both days, with a luncheon on Thursday noon at the plant of Nic Le Grand, Inc., and a banquet the same evening at the Black Hawk Hotel.

Development of Modern Railway Motors

With John Sutherland, Davenport, presiding as chairman, the first morning session was devoted to a paper by W. A. Clough, General Electric Company, Chicago, on "The Development of the Modern Motor," in which he described the changes which have taken place in the design of the railway motor to reduce the weight per horsepower. Refinements in mechanical design and the use of ventilation have made possible a motor of greater efficiency, with less maintenance cost. Mr. Clough presented several large blueprint drawings of motor designs, among them one showing the development of the armature shaft with large fillets and the absence of abrupt changes in diameter. Breakage with the present armature shaft design is appreciably less than with the former heavier construction.

The question of ventilation, according to Mr. Clough, has been the greatest stride in the development of the motor, and today affords the greatest opportunity for research. Summing up the subject, Mr. Clough said: "At the usual average mileage of 30,000 per year, the modern motor costs $15 annually to maintain, whereas the older type motor costs from $90 to $180 to maintain. The savings that have accrued to the railways through the modern motor, both because of less first cost or less maintenance, and because of reduced weight, amount to millions of dollars per year to the railway industry."

In the discussion which followed it was brought out that during the winter months, with heavy snow, ventilation cannot be obtained because it is necessary to seal up the motor shell, especially on interurban properties. That brush wear, particularly side wear, is due to dirt being blown against the brush was the opinion of John Dean, Westinghouse Electric & Manufacturing Company, as this condition is present only in the multiple fan type ventilated motor. Additional spring pressure on the brushes of small-sized motors was recommended by Mr. Dean as a remedy for flash-overs. Where pressures of 5 to 6 lb. now exist these should be increased to 9 or 10 lb.

Omaha Modern Shop Methods Are Described

O. A. Norene, Omaha, presented a paper on modern shop methods as practiced in the shops of the Omaha & Council Bluffs Street Railway. His talk covered the inspection of rolling stock and various shop methods and practices used by his company. As his paper explained a number of very useful shop kinks, they will be presented as short maintenance notes in the Maintenance of Equipment Department of the Journal. His talk was illustrated with photographs of machines used, copies of which were given to the members to take away.

Many questions on shop practice were asked in the discussion which followed, indicating that the paper had made an appeal to the operating men present whose methods differed from those of the Omaha property. Rebushing armature shafts to keep them up to size is the practice of the Tri-City Railway, according to John Sutherland, while the Waterloo, Cedar Falls & Northern Railway, according to W. G. Lamb, turns down the shaft and fits the new bearing to it. H. S. Day, Westinghouse Electric & Manufacturing Company, urged more modern methods in the shops.

Results of recent tests on welded rail joints as conducted at Ames University were reported in a paper by W. L. Wilson, chief engineer Des Moines City Railway, abstracted elsewhere in this issue.

At the banquet R. C. Smith, manager Tri-City Railway of Iowa, announced in his speech that his property would cease operation in ninety days. Paying out more money than it is taking in, the company finds itself badly in debt. The situation as it now stands, according to Mr. Smith, presents no solution, the city having turned down the last plan which might have relieved the condition, namely, rerouting through the business section. An increase in wages was met, which has added to the ever-mounting operating cost, although other things have been held to a minimum. He said that the only thing left now is for the community to realize the company's predicament and come forward to help.

Transportation Problems Discussed

Opportunity was afforded the transportation men present to discuss their problem following the paper, "How to Overcome Transportation Difficulties," in which M. A. Welsh, Waterloo, offered as a solution the proper training of the car operator. The immediate difficulties, according to Mr. Welsh, are those associated with accidents causing personal injury or damage, abuse of equipment, improper methods of fare collection, maintenance of schedules, and courteous treatment of passengers. Mr. Welsh gave some of the difficulties encountered in city councils of the various municipalities through which his property passes, low rates of fare and unrestricted jitney operation being two of the many injustices thrust upon it.

F. V. Skelly, superintendent Tri-City Railway of Illinois, stated that he had received a diminishing number of complaints since the training of car operators had been improved. It is his opinion that train service employees make the most desirable men for driving buses, which his property uses in conjunction with the railway cars. According to Mr. Skelly, many changes have taken place in the transportation department and the future will see many more such changes.

Development of the Modern Railway Gear

A paper prepared by W. H. Phillips, R. D. Nuttall Company, Pittsburgh, was read by Mr. Dean, due to Mr. Phillips' absence on account of sickness. Mr. Phillips' paper is presented in abstract elsewhere in this issue. With manufacturers spending thousands of dollars yearly in the perfection of the gear, their efforts are wasted if master mechanics allow axle bearings and armature bearings to become badly worn, was the statement made by W. G. Brooks, Westinghouse Electric & Manufacturing Company, in discussing Mr. Phillips' paper.

Adjournment followed the election of John Sutherland as chairman for next year's operating men's meeting of the Iowa Electric Railway Association.

Development of the Modern Gear*

Methods in the Design and Treatment of Gears Within the Past Few Years Have Made Possible a Great Increase in the Duty and the Life to Be Expected from Gearing

By W. H. Phillips
Manager Works and Engineering, R. D. Nuttall Company

FROM the crude cast iron gear of a few years back, which, even with light loads and low speeds, gave only a few thousand miles, we have passed through a period of gradual evolution to the present-day forged steel, accurately cut and scientifically heat-treated gear that frequently is piling up a million or more car-miles.

The seriousness of vibration, whether of great or small amplitude, has always been recognized, and to no small degree vibration may be traced to the gear. The bearings that wear out too quickly, the shafts and pedestals that get out of alignment, the machine parts that become fatigued and fail, the motors that wear out commutators and brushes too quickly and the armature leads that break—all these may be traced, in part at least, to vibration.

Increasing the life of a gear means far more than the saving in initial investment. Tripling the life not only cuts the cost of the gear to one-third but it also does away with two removals of worn-out gears and the installation of two new gears. It eliminates the necessity of having the particular equipment out of service, possibly for hours, with its possible effect upon still other equipment dependent upon it.

The permissible reduction in sizes, due to improved material, heat treatment and greater tooth strength through better design, offers new possibilities in saving material and space. Together with higher efficiency through better tooth forms and greater accuracy in manufacture, this reduces power consumption, which, while small, is continuous.

One of the surest indexes to the efficiency of a gear is the noise it makes. Aside from the losses due to the noisy gear, it does not tend to promote efficient man power.

LONG AND SHORT ADDENDUM GEARS

Essentially, the long and short addendum gear system, which came into prominence with the advance in automobile design, accomplishes a short pushing of the tooth into mesh and a long pulling of the tooth out of mesh. The driver or pinion has a long addendum, or portion of the surface above the pitch line, and a short dedendum, or portion of the tooth surface below the pitch line.

The pinion when rotating comes into action near the base, and rolls and slides up until it is in line with the gear and pinion centers. Thus far it has touched only on its dedendum. It now starts to mesh above the pitch line and traverses the addendum over a longer surface. A short arc of approach and a long arc of recession make up the angle of action of the tooth. Contrast this action with that of a gear set of the common type where addendum and dedendum are equal. The arcs of approach and recession are equal.

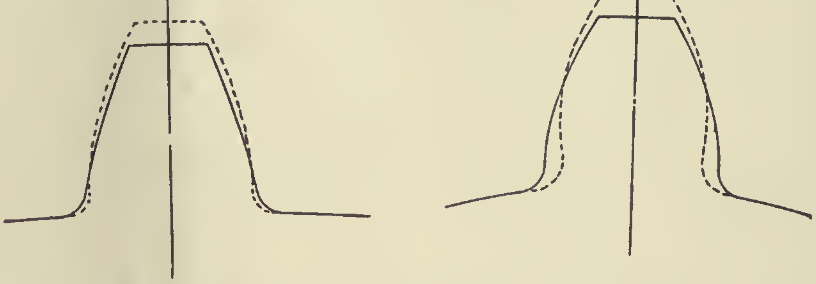


Fig. 1—At the Left Is the Gear Tooth and at the Right the Pinion Tooth
The standard tooth is shown dotted and the stubbed tooth in a solid line

The relative tooth thickness of the pinions at the base or heaviest stressed section with the long and short addendum pinion tooth is 50 per cent stronger than on the standard involute system, due in part to the greater tooth thickness and in part to the shorter cantilever effect. Fig. 1 shows the gear and pinion teeth of each system superimposed.

Another distinct advantage derived from this type of tooth is that the relative sliding between contacting tooth surfaces is reduced 50 per cent, as shown in Fig. 2.

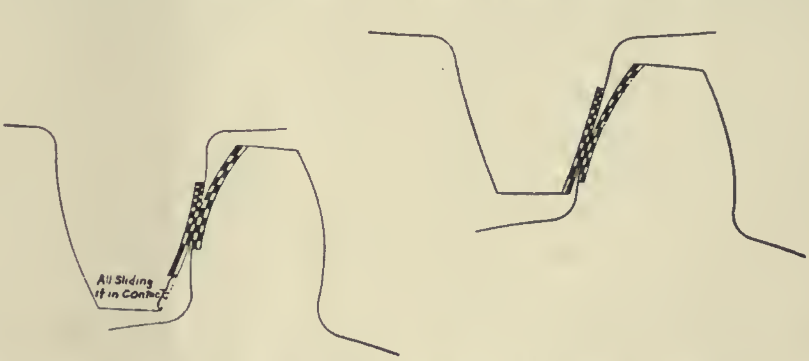


Fig. 2—At Left, Standard Gear Teeth; at Right, Long and Short Addendum Teeth

The quality of quietness cannot be secured if there is vibration, hence the angle of action of one tooth must be such that it will not leave contact before its following tooth has entered. If it does, action of the gear set will be jerky, causing vibration and noise, together with wear and other undesirable qualities. As involute teeth mesh, the contacting points of their surfaces roll and slide together at such a rate as to produce theoretically uniform rotation of their pitch circles.

The more a gear tooth is stubbed the greater will be the percentage of rolling of the contacting surfaces. This is considered desirable for reducing friction, and therefore wear, and consequently promoting smoothness of operation. Angles of action alone, as well as other features, would not permit stubbing teeth excessively to increase the proportion of rolling. Stubbing teeth too greatly would tend to decrease wearing surface.

The standard 14½-deg. involute tooth was among the first in the field. It was, and is, rotary cut and, since the milling cutter must clear itself, the tooth contour was modified decidedly, due to undercut in small numbers of teeth. This modification consists in filling in the flank of the tooth and relieving the tip. A certain amount of relief cannot be said to be objectionable since it eases the teeth in mesh. If involute curves could be generated theoretically perfect, the relief would still be desirable, since teeth under load unavoidably tend to deflect some small amount. This relief, however, should be only sufficient for such functions and not dependent on cutter requirements.

MANNER OF PLACING TEETH ON GEAR FACE

In the last few years engineers have been studying the manner in which the teeth should be placed on the face of a gear. Spur, stepped and herringbone gears are all well known. The latter operate with peculiar smoothness and are stronger than spur gears of the same tooth dimensions. They have disadvantages, in wearing where there is external end thrust, in the gear being unable to slide by the pinion and in extra width of the face, due to the center groove necessary for manufacturing purposes. Also, it is difficult to synchronize the two helixes properly when cutting. Their smoothness of operation was long supposed to be due to actual tooth overlap and consequent pitch-line lock; that is, there were always teeth in contact at the pitch lines.

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*Abstract of a paper presented at the Davenport meeting of the Iowa Electric Railway Association, Sept. 7, 1923.

Low-angle helical gears were not employed as they necessitated wide faces for tooth overlap, and it was furthermore supposed that the unbalanced end thrust due to the single helix would be excessive. However, experience has shown that a low-angle helical gear, not necessarily having overlapping teeth, gives smoothness and quietness of operation. The first street railway helical gear set has run 500,000 car-miles, is less than one-fourth worn, is still running and has at least doubled the car mileage of the pinion. Just as it is difficult to visualize the advantage of the long and short addendum, so with the helical gear. Apparently the helix permits a minute section of tooth face and a correspondingly minute load to enter engagement, the load picking up as the face in mesh widens out, thus preventing tooth deflection. The end thrust for the usual 7½-deg. helix angle varies from 10 to 13 per cent. Where this is too great, a smaller helix angle is selected. Provision for end thrust usually is found in collars already on shafting or in the resistance of the motor to leaving its magnetic center.

When the helical gear was developed the features of long and short addendum gearing, high-pressure angle and a certain percentage of stubbing were incorporated in the tooth in order to give it the advantage of these desirable qualities.

STRENGTH OF GEAR MATERIALS

The tooth being loaded as a cantilever beam, the grain structure in the raw material should be radial if possible to give the tooth the benefit of the full strength of the steel. This is being accomplished to some extent in the upset hammer-forged pinion and to a greater degree in the drop forging. The forged and rolled steel gear blank is also produced with this radial grain. When castings are used, especially when they are heat treated, clean steel is necessary, particularly at vital sections.

With heavy masses tied together with thin sections a surprisingly small flaw will cause failure of the piece in heat treatment. Heavy internal stresses at the point where the tooth joins the heavier mass of the body of the gear will seriously impair the strength of the tooth, which is stressed most heavily across this section in performing its work. This condition has eliminated the use of alloy steel in heavy gearing, since it fails through fatigue.

Tests of Welded Rail Joints*

Investigation Made at Iowa State College Indicates that Workmanship of Construction of Joint Is More Important than Type of Welding Employed

By W. L. Wilson
Chief Engineer Des Moines City Railway.

SOME interesting tests of rail joints were made a little over a year ago at the Engineering Experiment Station, Iowa State College. The primary purpose was to determine what kind of an arc-welding machine to buy.

The following tests were made: 1. Solid piece of rail with no joint. 2. Thermit weld. 3. Seam weld, side plate only, Indianapolis arc. 4. Seam weld, side plates only, General Electric arc. 5. Seam weld, side plates only, Rail Welding & Bonding arc. 6. Bolted continuous joint. 7. Seam side weld, side plates and base plate, Indianapolis arc.

In order that there should be no error due to differences in the rail itself all pieces used in these tests were cut from the same rail, the section being 7-in., 80-lb. Tee, H. S. Co. No. 335.

The solid rail was 6 ft. long and each sample joint consisted of two 3-ft. pieces, welded or bolted together. All tests were made on a Riehle 100,000-lb. testing machine. This was the largest machine available at Ames and in order to stress the various sample joints sufficiently to obtain good results it was necessary, on account of the low capacity of the machine, to support the test pieces on 60-in. centers. This was longer than desired, but the results obtained gave good comparative data anyhow. Deflections were read by a Riehle deflectometer, reading to one-thousandth of an inch, and readings were taken at increments of 5,000 to 10,000 lb. loads, applied midway between supports.

The results of the tests have been plotted and are shown in the accompanying chart.

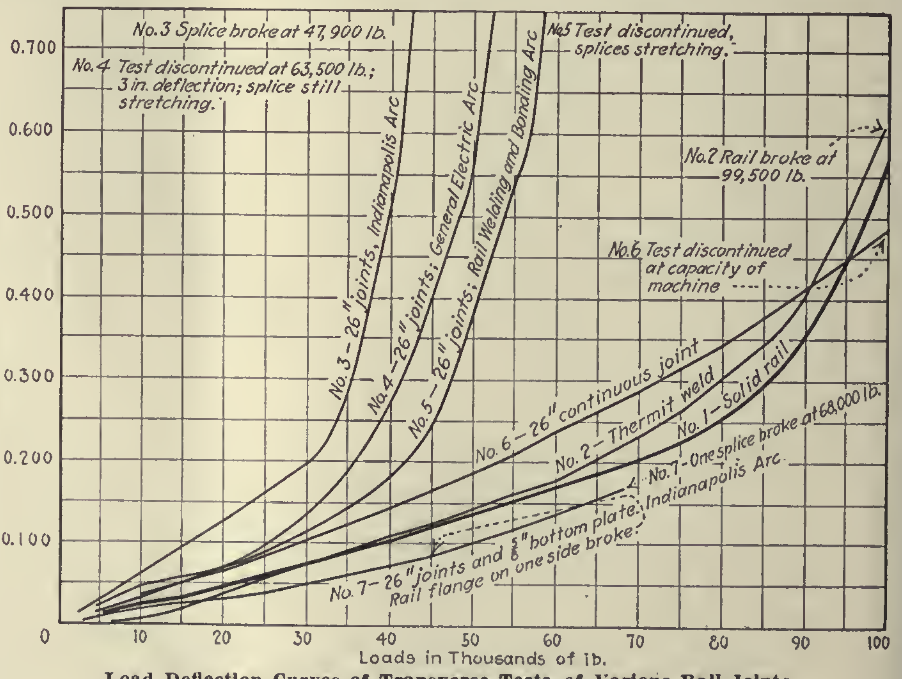
Test No. 6 is an interesting one, being that of a standard 26-in. continuous rail joint held by six 1-in. x 4½-in. heat-treated bolts having Harvey grip threads and Ideal received nuts. This joint has been the standard in use by the Des Moines City Railway for a number of years previous to 1922.

LENGTH OF WELD PLATES MAKES LITTLE DIFFERENCE

As stated before, the primary object in making these tests was to determine which kind of arc or electrode or which polarity of the electrode was best, but the results, so far as I can see, indicate very little if any difference. Neither does the length of weld plates make much difference, except of course in cases of very short plates. The addition of a base plate, however, does seem very materially to increase the stiffness of a joint.

It has been and still is my opinion that the personal equation or workmanship has a very great deal to do with the life of rail joints. A poorly designed joint, carefully and thoroughly applied, might last much longer than the best type of joint poorly applied. Many plain bolted joints can be found in almost perfect condition after several years of service, while perfectly good continuous joints with heat-treated bolts can be found commencing to fail in a year or less, due simply to lack of care in fitting up, clearing rail ends, tightening bolts or other poor workmanship.

This same line of thought applies not only to the bolted joint but I believe equally well to the seam-welded or any other type of joint. So we must not



Load Deflection Curves of Transverse Tests of Various Rail Joints Made at Iowa State College sit back and think because we are welding joints today that we are eliminating most if not all of our troubles. The question is, Are we getting good welds? Furthermore, it must not be thought that welding alone will make good track out of track that because of improper design for the traffic it must carry never could be good. In other words, welded joints alone are worthless unless we have the right type of rail, good ties, good ballast, good drainage and, above all, good workmanship in everything.

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*Abstract of a paper presented at the Davenport meeting of the Iowa Electric Railway Association, Sept. 6, 1923.

New Rolling Stock Reduces Maintenance Costs*

THE economies in maintenance of equipment and in upkeep of the right-of-way resulting from the purchase of new rolling stock were the principal points made by R. S. Pilcher, manager of the Edinburgh Corporation Tramways. Mr. Pilcher has had a good opportunity recently of ascertaining the difference in operating cost between old equipment and modern equipment. He has been in charge of the cars operated by the newly electrified Edinburgh Tramways and also those of the Leith Tramways, which recently was amalgamated with Edinburgh. The cars in Leith are a good many years old.

REPAIR COST VARIES WIDELY WITH DIFFERENT CARS

Mr. Pilcher first pointed out that the working costs of different tramway undertakings, i.e., traffic expenses per car-mile, were all very similar, but car repair costs showed considerable differences. This could in some cases be traced to differences in the type of car operated, variations in road gradients, etc., but after making such allowances there appeared to be too great a difference in the operating costs. In Britain in very few cases has there been a general scrapping of old rolling stock for the purpose of introducing new. From replies to queries which Mr. Pilcher has sent to all the municipal tramway undertakings in the country as to the cost of car repairs, it appeared that the cost varied from 1d. per car-mile to 4.29d. per car-mile. Such a wide range warranted investigation.

In preparing figures for the new Edinburgh cars and the older Leith cars he said that the former had light equipment and had been working for eighteen months. In Edinburgh they had had more experience than had any other system with the light-weight high-speed motor. A general reduction in weight among all parts of the car had been effected, the reduction being from 11 tons 2 cwt. (24.864 lb.) to 9 tons 9 cwt. (21,168 lb.), while the center of gravity had been slightly lowered. By reducing weight much would be accomplished, Mr. Pilcher thought.

The smaller wheels adopted weighed 17 cwt. (two pairs with gears) compared with 22 cwt. Two motors of 50 hp. each weighed 1 to 9 cwt. 2 qrs. (3,304 lb.), against 1 ton 11 cwt. (3,472 lb.) for two of the older motors of 25 hp. each. The new truck and electric equipment complete weighed 3 tons (6,720 lb.) against 4 tons 1 cwt. (9,072 lb.). There were also reductions in car body weights. Yet the new cars seated sixty passengers while the old seated only fifty-four.

NEW LIGHT-WEIGHT MOTORS HAVE GREATER EFFICIENCY

The large reduction in dimensions and weight of motors per horsepower was due to the provision of highly efficient fan cooling and the use of very powerful interpoles. These factors allowed of a large increase in output at a much lower temperature rise than had ever been obtained with the older motor design. The average temperature rise of the light-weight motor after sixteen hours running was 87 deg. F., against 121 deg. F. on the older motor. The energy consumption per car-mile with the new motor was 1.18 units against 1.24 units in the case of the old motor. Local conditions varied, but it was quite clear that if new equipment were purchased it was possible to obtain greater speed and smoother running at less cost. The author gave detailed estimates of the various items of cost for running and repairing motors and trucks, and cost of energy per annum. The total for the new type car was £21 8s. 1d., and for the old type £36 19s. 11d. This was on a basis of 44,051 miles per car per annum.

The introduction of new equipment also reduces the maintenance of the permanent way, and new trucks with longer wheelbases lengthen the life of tires by reducing the wear on the wheel flanges. The greatest advantage was obtained by the more rapid acceleration of motors and their extra capacity, as they could be forced on occasions without overheating or injury. In Edinburgh it had been proved in practice that seven new cars do the work of eight old cars, which means a saving in rolling stock of 12½ per cent, and also a saving in drivers' and conductors' wages of £681 per annum for each car saved. The actual saving in motors and trucks plus this saving was equal to £144 1s. 9d per car per annum, or 0.78d. per car-mile.

On the new light-weight cars 25-in. wheels were used and after eighteen months they were found to be wearing very well. They had every appearance of giving as good a life as the larger wheels. The speaker also referred to experiments now being carried out in Edinburgh with rubber packed wheels, but sufficient time had not elapsed to allow of a definite opinion on this subject.

The saving of 0.78d. per car-mile, he pointed out in conclusion, represented about £144 per car per annum. This sum capitalized at 4½ per cent on a twenty-year life represented a capital of £1,515, which was more than sufficient to purchase a new car equipment. In many cases it would be an economical policy, he said, to spend money in order to save money.

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*Abstract of a paper presented at annual conference of Municipal Tramway Association, Portsmouth, England, Aug. 22-24, 1923.

American Association News

Preliminary Report on Welded Joint Tests

THE test joints called for in the preliminary series of tests of the committee on welded rail joints of the American Electric Railway Association and the American Bureau of Welding to determine the present state of the art have nearly all been made up and shipped to the Bureau of Standards, the University of Illinois and Purdue University, where they will be given conductivity, tensile, impact and bend tests.

The testing has already been started, and a preliminary report that will show the test results will be available for discussion at the next meeting of the committee. The meeting is scheduled for Wednesday, Oct. 10, at 10 a.m., in the Engineering Meeting Room on Young's Million Dollar Pier, Atlantic City.

It is also planned to have on exhibition in the A. E. R. A. booth some sample joints broken up under the various types of tests. Photographs of other joints tested will also be available.

Educational Luncheon Scheduled

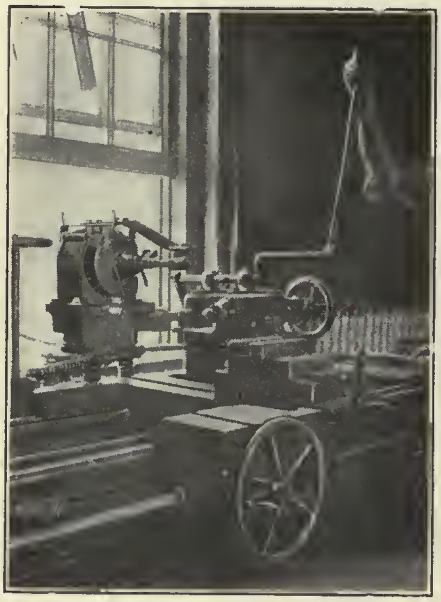
EDWARD DANA, general manager Boston Elevated Railway, who is chairman of the American Association committee on education, has arranged for a luncheon of men interested in employee training, to be given in connection with the convention to be held at Atlantic City.

Invitations have been extended to all members of the committee on education, and to the men who have been appointed by a large number of member companies to look after local educational matters in co-operation with the committee. The luncheon is scheduled for 1 p.m., Thursday, Oct. 11, and it will be held in one of the private dining rooms at the Marlborough-Blenheim Hotel. The luncheon has for its purposes the discussion of plans, methods and a program for next year, and the fostering of friendly relations among the men who by virtue of their appointment are particularly interested in the committee's work. It is expected that officers of the association will be able to attend the luncheon in order to become more conversant with the work of the committee. Chairman Dana desires to learn as soon as practicable the names of the men who expect to attend.

Maintenance of Equipment

Commutator Slotter Operated on Lathe Bed

IN THE armature shop of the Knoxville Power & Light Company the commutator slotter forms an integral part of the lathe which is used in turning commutators and banding armatures. It is mounted permanently on the back of the lathe carriage and can be brought into action instantly after a commutator has been turned, without any setting up operation to get it ready for use.



This Commutator Slotter Is Mounted on the Lathe Carriage, but Will Groove a Skewed Commutator

The cutting saw is carried on the end of an extension of the shaft of a G. E. 1-hp., three-phase induction motor, the end of the shaft being supported in a bearing carried by a piece of flat steel bolted to the top of the motor frame. The same shaft carries a four-blade fan for blowing away the saw cuttings.

The motor is bolted to the body of a lathe toolpost carriage, the guides of which are set practically parallel to the guide rails on the lathe bed. The toolpost carriage, however, is mounted on a turntable, so that it can be rotated slightly to permit the saw to follow a groove even if the commutator is skewed somewhat. Rotary adjustment is made by means of a set screw opposed by a strong steel spring, visible in the picture.

To provide adjustment of the saw up and down, the whole motor mounting is on a sliding rod and its position is changed by an adjusting screw which can be turned through bevel gears by means of a hand wheel that can be seen to the left of the motor.

For the purpose of feeding the saw through the groove, a simple lever system is provided, so that, by pulling on a handle as indicated, the operator can push the motor toward his left in a direction determined by the toolpost carriage guides. The main handwheel on the lathe carriage is used to bring the saw up to the work, after which the feed is controlled as stated. The feed could not be controlled by the main hand wheel because in that case it would always be exactly in line with the lathe bed.

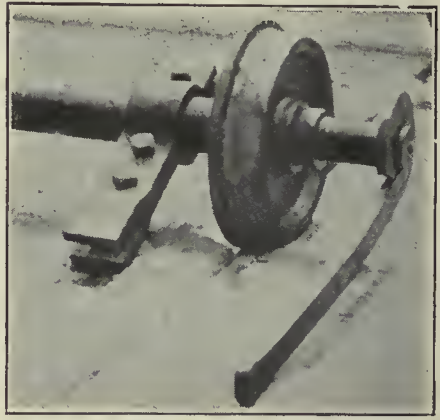
The peculiar crank form given to the rod to which the operating lever is attached is necessary to permit it to clear the tailstock center spindle wheel. At the other end of the rod is the crank by which motion is transferred through a connecting rod to the slide on which the motor is mounted.

C. A. Walker, electrical foreman in the Knoxville shops, who is responsible for the above design, states that the average time to groove a railway motor commutator is about ten minutes. The armature, the commutator of which is being grooved, is turned and set in position by hand.

Simple Dolly for Cars with Broken Axles

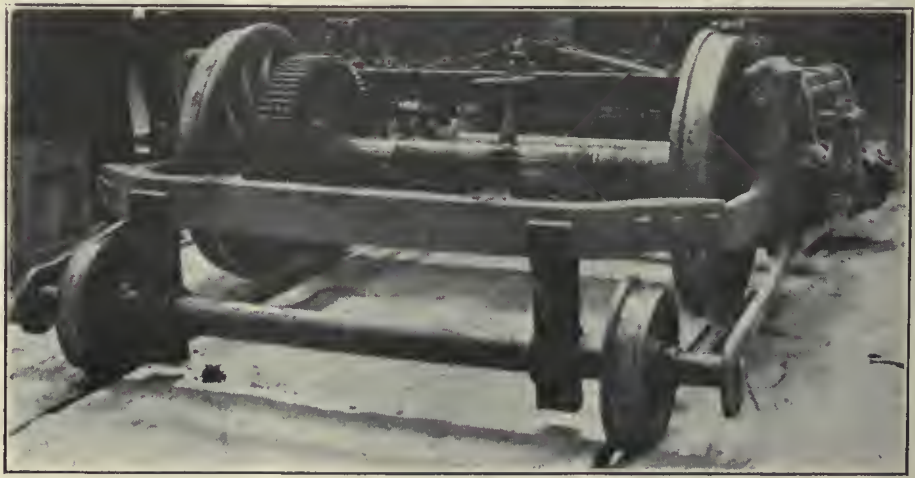
BY F. HOLLINGSWORTH
Supervisor Power Saving, San Diego Electric Railway, San Diego, Cal.

IN ORDER to avoid delay in service from cars with broken axles and to provide for bringing them into the shop promptly, the San Diego Electric Railway has constructed a portable dolly. This consists of a pony axle with two 14-in. cast-iron wheels arranged to support the end of the truck frame through two 1-in. x 4-in. iron clamps. Tie bars made of ½-in. x 2-in. iron form a solid connection to the truck pedestal. The wheels run loose on the axle and are held in place by collars and pins on the outside. The connecting bars fit around the axle in the check plate grooves.



Construction Details of Portable Dolly

The dolly is quickly installed by raising the end of the truck frame



Portable Dolly for Broken Axle Attached to Truck and placing the axle and wheels of the dolly under the bar of the truck end frame. The clamps which fit around the axle are adjustable so as to clamp any width or thickness of truck frame. After these are tightened firmly, the tie bars can be put in place by bolting to the truck pedestal, using the same bolts that hold the pedestal tie bar.

By cutting out the motor on the broken axle, the car can be brought to the shop under its own power with very little delay. The use of this dolly saves the wheels and besides it can be loaded into a small truck and taken to a disabled car very quickly, which avoids the necessity of sending out the wrecking car. This dolly was constructed in the railway company shops of scrap material at small cost.

Making Case-Hardened Pins and Bushings

By O. A. NORENE

Assistant Master Mechanic Omaha & Council Bluffs Street Railway

WE ARE using case-hardened seamless steel bushings on brake riggings and door mechanisms on all our cars in Omaha. All bushings are made in our own shop by using a small special fixture in the lathe. This simple fixture can be made at a small expense in any shop equipped with a lathe. One man can cut 1-in. bushings with a ⅛-in wall, chamfered inside and out at one end, at a rate of 100 per hour. The other end is chamfered on a drill press by being held in a pair of tongs.

Brake pins are made in special heading tools, fitted with tool steel dies which can be replaced when worn beyond the limit. With these tools the pins can be made perfectly true, and no other machinery is required except drilling cotter pin holes and chamfering the edges of the holes.

All brake pins and steel bushings, brake adjuster screws, fulcrum and rocker arm pins, etc., are case-hardened in our own furnace. Kerosene is used for fuel. We formerly used crude oil, but it was not satisfactory for regulating the heat of the furnace, as it required too much attention. In our brake-rigging repairs all new and rebuilt brake levers and hangers and brake beams are always drilled by standard steel-bushed templets, that are plainly marked for the type of trucks the parts are to be used on.

Clamp for Emergency Repairs to Third Rail

THE third rail of a portion of the New York Municipal Railway is welded together by short pieces of copper cast in place at the joints, the intention being to make an efficient bond at the joints and also to hold the rails together and in line without the use of joint plates. The conductance of the joint is very high, being equal to that of a similar length of unbroken third rail, and the cast type of weld supports the joint in a satisfactory manner.

Clamp for Broken Joint of Third Rail

Some trouble was experienced, however, due to the joint breaking. The bond was too short, and the amount of copper used was too small to withstand the stresses set up by expansion and contraction, and those caused by constant vibration. Repairs to these joints required a considerable length of time and so a temporary connection of the type shown was devised.

This consisted of a clamp as shown in the accompanying illustration. These clamps are made of iron in two portions and are bolted together under the base of the rail. They hold the rail in line satisfactorily, and also carry heavy current without trouble.

New Shop Lighting Plan in Chattanooga

THE Chattanooga Railway & Light Company, a subsidiary of the Tennessee Power Company, is improving the lighting of its shops by the following arrangement, which has already proved highly satisfactory to the extent installed: 200-watt nitrogen-filled lamps, in "Ivanhoe" dome reflectors, are placed about 20 ft. apart each way and 16½ ft. above the floor.

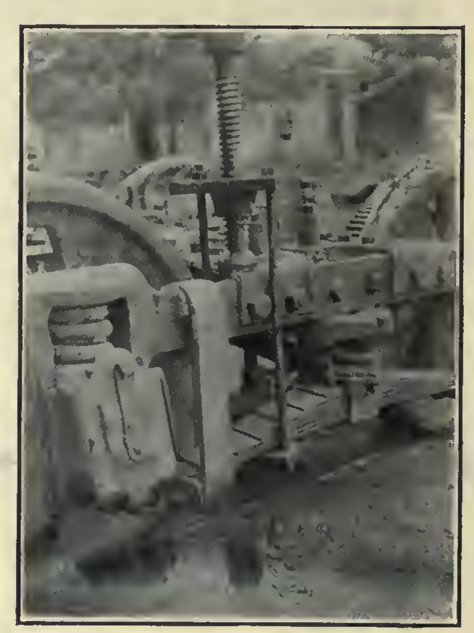
This arrangement not only gives a well-distributed illmination, but locates the lamps well above the cars so that roof repairs can be made without obstruction and with plenty of light.

Removing an Elliptic Spring from a Truck

A DEVICE which permits the safe and speedy removal of elliptic springs from a truck is one devised in the shops of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va. It is a screw clamp, by means of which one end of the spring can be drawn up toward the truck side frame. The clamp consists of a flat plate through which two bolts pass upward to a crosshead, which is threaded to receive a square-thread screw about 2½ in. in outside diameter. A boss cast under the crosshead provides a sufficient length of thread to resist the thrust when the screw is clamped firmly down against the truck side frame.

Nuts on the upper ends of the bolts resist the upward push of the crosshead when the clamp is in action and are removed when it is to be put into place or taken off the truck.

The upper end of the threaded rod has an enlargement through which a hole is bored large enough to receive a crowbar, permitting any desired force to be applied. On the bottom of the screw is a loose disk to prevent slipping when the force is applied.



It Is Easy to Take Out a Semi-Elliptic Spring with This Device

This simple device eliminates an operation which formerly was slow and unpleasant, involving a certain element of danger.

New Equipment Available

Electric Fork Lift Truck

THE demand for an electric truck that will enable one man to go into the yard or shop and get a 2,500-lb. piece of equipment has led to a recent addition to the Elwell-Parker Electric Company's line of "Lift and Carry" trucks.

This new truck has provision for carrying the load beyond the front axle. The platform, or forks, which supports the load, is arranged so that its lower side will touch the floor if necessary, or it can be stopped at any height between upper and lower limits. These forks may be so shaped at the outer ends as to be inserted beneath a bundle, box, barrel, casting, or any irregular shaped piece, weighing up to 2,500 lb. The length of the arms or forks depends upon the weight carried, since due consideration must be given to the loading of the front axle. Inasmuch as the load handled balances an equal weight of the truck back of the axle, necessarily the pressure imposed on the wheels is very great. A specially heavy axle, with large roller bearings, carries dual 10-in. x 3-in. tired wheels. These wheels, as well as the rear drive wheels, are steerable.

New Electric Fork Lift Truck

The raising mechanism consists of a separate motor with worm gear reduction attached to a movable platen, supported on the truck frame by means of three rocking links. This electric lift mechanism is assembled as a unit. The propelling unit in this truck consists of a heavy duty motor and controller direct-connected through a flexible coupling to a worm and wheel bevel pinion differential. Drive shafts with chrome vanadium universal joints and clutch plates bolted to the outside of the wheels complete the full floating drive axle.

Improved Stop-Light Signal

THE Nichols-Lintern Company, Cleveland, Ohio, announces a new electric railway stop-light signal for electric railway service. This new signal is designed to meet the demands for a single light system of signaling for low speed and stops. The lantern is arranged with a bracket, so that it can be set at any desired angle and fit the curvature of the dasher of different type cars. The signals displayed are a red indication whenever power is off and a dark or no light indication whenever power is on. The red indication continues regardless of the position of the brake, until the controller is thrown to an "on" position when it dims very perceptibly, and indicates that the car is starting. When the controller reaches the parallel position, the light goes out.

The signal equipment consists of a switch, two resistance units, and the lantern. One resistance unit, together with the switch and light, is connected between the trolley and positive side of No. 2 armature on two motor equipments. The remaining signal resistance unit is connected between the negative side of No. 2 armature and ground. The signal lantern is arranged to use a standard 23-watt railway lamp.

The Bracket Construction Provides for Setting the Lantern at Any Desired Angle

Single-Speed Bench Lathe

A SINGLE-SPEED, portable 6-in. bench lathe has recently been placed on the market by J. D. Wallace & Company, Chicago. This machine is a very small electrically driven woodworking lathe designed to do the smaller turning operations which make up a great share of the work in many wood-working shops more quickly and more economically than they can be done on larger machines.

The lathe is intended for work up to 6 in. in diameter. It clears 5 in. over the tool rest and 7 in. on the face plate, with full 24 in. between centers. After extensive experimental work the manufacturers have set 3,400 r.p.m. as the best speed for this class of small work.

A Small Portable Lathe Which Can Be Adjusted for Any Length Up to 24 In.

The machine weighs but 203 lb. and can be moved at will, close to the bench, to get proper light on the work, etc. At the same time it is heavy enough to stand rigidly without vibration. Its height over all is 46 in. and length over all is 40 in. The sub-base is open so that it serves as a convenient holder for tools.

A ⅓-hp. constant-speed General Electric motor is built into the headstock and is entirely inclosed, making it dustproof. It is direct connected to the lathe spindle on ball bearings and it provides ample power for cutting up to the limit of the lathe. It is controlled by a conveniently located switch, and as there are no belts to shift, the safety element is well taken care of.

Standard equipment includes the motor, two tool rests (6 in. and 12 in.), spur center, hand wheel, face plate, 10-ft. lamp cord and plug to attach to electric light socket.

The News of the Industry

Petition Presented

Virginia Property Seeks Paving Relief in Portsmouth—Operation Is Unprofitable

The Virginia Railway & Power Company, Richmond, has presented a petition to the State Corporation Commission seeking relief from a clause in its Portsmouth franchise requiring the company to pave between its tracks and 2 ft. on each side when the city shall designate. The petition is the outcome of an order by the city of Portsmouth that the company pave a number of streets within a period of ninety days. The order came from J. P. Jervey to Norman Jones, general manager of the Norfolk division, of which Portsmouth is a part. If complied with the order will mean the expenditure of approximately $200,000.

With its request for relief the railway has filed a financial statement for the property in question, showing that the gross earnings of the property from Jan. 1 until July 31, 1923, were $157,091 and the operating expenses $166,292, resulting in a deficit of $9,201, before deduction of $8,235 for taxes and $33,400 for interest, rentals and sinking fund charges. The gross deficit for the period amounted to $50,836. A statement showing that for 1922 gross earnings were only $203,201, while operating expenses were $287,171, and a gross deficit of $155,749 was also filed with the petition.

Alexander Forward, commissioner in charge of transportation regulation in Virginia and under whom the electric railways and bus operations come, stated in commenting on the petition that he believes the document to be unique and nowhere could he find one that has ever been presented to a corporation commission seeking a similar release from franchise requirements.

The petition relates that the company's properties in Portsmouth are unremunerative, that service is maintained at a loss, that it is the amalgamation of several different companies and that some of the lines are constructed so as to be in competition with one another. In part the petition states:

> Your petitioner for many years has tried to make arrangements with the city of Portsmouth with the object of eliminating duplications of service and putting service into operation in territories which are now not adequately served by its lines. These efforts have not been successful, due largely to the fact that the authorities of the city of Portsmouth seek to impose such burdens as that your petitioner is of the belief that successful operation cannot be had at rates which the residents of said territory would be willing to pay.
>
> Your petitioner is now charging and collecting a base fare of 6 cents on its lines in said territory and has authority to charge a base fare of 7 cents. This latter rate has never been placed into effect because the city of Portsmouth licenses jitney buses to traverse territories which your petitioner serves with its street railway system and in some of which your petitioner is required to maintain duplications of service, making in some territories three lines of service, so that your petitioner is greatly hampered in its ability to continue rendering service.

The company holds that the paving required in the principal street on which the company operates is 60 ft. wide and that the center of the street, occupied by the company, does not need paving.

Thomas S. Wheelwright, president of the company, believes that the burden of street paving materially increases the cost of transportation to the rider and in illustrating his point to the writer pointed out the example of the city of Petersburg. He said that Petersburg was the only city in Virginia with a 5-cent fare and with railless cars in operation. Further that it has a 5-cent fare by virtue of the fact that the city does not require the company to pave between its tracks and under its own original (not copied) franchise does not charge the company a gross earnings tax.

Mr. Wheelwright said the entire trouble originated in Richmond many years ago when in the first franchise granted in this country the city required the companies operating the horse cars to pave between their tracks and 2 ft. on each side as the horses used by the cars wore out the street. Other cities followed close on the heels of Richmond, and in writing their first franchises obtained copies of the Richmond document, copying the clause about the pavement until it became universal.

Mr. Wheelwright said the clause objected to was a bad one in any franchise because it was an indefinite obligation and required the company to pave any streets designated by the city. In this way the company cannot know what its obligations are to be during the coming year.

May Abandon Service in Davenport

$1,492,214 Deficit Accumulated in Five and One-Half Years—2,000,000 Fewer Passengers in 1922 in City of 57,000 People than in 1914 with Population of 43,000

After losing money for six years and losing it faster now than at any time since the electric railway transportation situation at Davenport became acute, the Tri-City Railway of Iowa has offered to surrender its franchise and has notified Mayor Mueller that unless some remedial action is taken service must be discontinued.

The city recently turned down the company's offer to reroute its street cars at an expenditure of $400,000. At the time the Council reached its adverse decision the city was told by General Manager R. J. Smith of the traction lines that service would probably be discontinued.

B. J. Denman, president of the company, considers the situation from all angles in a detailed statement, accompanied by financial statements for the past six years, which show that the traction lines in Davenport have been steadily losing money.

A steady decrease in patronage and a rapid increase in the number of automobiles are big factors in the decline of the railway business, it is stated. The heavy charge for paving and taxes are other discouraging factors, Mr. Denman points out.

He suggests that the situation be put before the civic clubs and the city as a whole and that an attempt be made to work out some plan of financial relief. His communication to the Mayor, dated Sept. 4, outlining the situation is as follows:

"It is with deep regret that I am obliged to inform you that the financial situation of the Tri-City Railway is such that unless some plan can be immediately devised to place its operations upon an earning basis it must permanently discontinue its service. The officers of the company have striven with this problem to the very limit of their ability. Notwithstanding their loyal and unceasing efforts, the situation of the company has grown steadily worse. Our own analysis convinces us that the problem can be solved only as a community problem. If a street railway is essential to the welfare of the city, and we believe it is, then its abandonment is a serious community concern and must be so treated. We believe that the united efforts alone of the community will save this railway.

"Though engaged in a public service, it is a business enterprise. Like any other business enterprise, it must pay for everything it receives. It has only one source of revenue. This source of revenue has steadily failed, while its expenses have steadily mounted. No business can permanently withstand such a condition.

"In order that you, and through you the community, may be fully apprised of the seriousness of the situation, we are attaching tables which disclose

STATEMENT OF TRI-CITY RAILWAY, YEARS 1918 TO 1922, INCLUSIVE, SHOWING ANNUAL DEFICIT OVER RETURN ALLOWED BY CITY APPRAISAL AND AUDIT OF JUNE, 1920

	1918	1919	1920	1921	1922	1st 6 Mos. 1923	Total 5 Yrs. 6 Mos.
Gross earnings........	$758,198	$806,268	$959,299	$801,130	$752,415	$388,391	$4,465,702
Operating expenses...	737,683	860,227	994,937	845,755	709,131	368,856	2,516,592
Net earnings..........	$20,514	*$53,959*	*$35,638*	*$44,625*	$43,283	$19,534	*$50,889*
Deduct—Return allowed by city.......	261,252	260,873	263,372	258,192	265,089	132,544	1,441,324
Deficit..............	*$240,738*	*$314,832*	*$299,010*	*$302,817*	*$221,805*	*$113,010*	*$1,492,214*
Number of revenue passengers.........	15,399,603	15,238,451	13,215,382	9,718,203	9,553,579	4,983,970	68,109,188

Note—Italics denote deficit.

vividly the true status of the company. Perhaps I may be pardoned for calling attention to some specific figures. First, it is of interest to know that one of the serious conditions with which the company is confronted is a failure on the part of the public to ride on the cars.

"In the year 1914, when the city had a population of about 43,000, we carried 11,791,000 passengers; in the year 1921, with a population of more than 57,000, we carried only 9,718,000 passengers. In the year 1915 we carried 11,200,000 passengers and in the year 1922 we carried 9,555,000 passengers. From present indications, for the year 1923 we will carry fewer passengers than we did in either of the two preceding years. Here, of course, is a steady and rapid drying up of our source of revenue.

"Thousands of persons have ceased to patronize the street railway and hundreds of these have become in effect active daily competitors of the street railway in that they not only carry themselves to their work in their own automobiles, but also carry as many other persons picked up along the street and at corners as their cars will hold. Thus thousands of the inhabitants of Davenport who were formerly our daily patrons are now our patrons only on the casual occasions when their motors are out of order or weather conditions make it seem undesirable to drive. It is interesting to note that on Sept. 1, 1923, there were 4,000 more automobiles in Davenport and Scott County than there were in 1920.

"The affairs of the company were thoroughly investigated by the Council in 1920, and this was covered in a report submitted in January, 1921. This was not only a complete audit of the books of the company, but included a detailed valuation of the property. The company has not accepted this valuation, considering it entirely too low. Inasmuch as we have no return upon investment whatever, the valuation used is not so important, and in the attached statement we are using the return allowed in the city's audit.

"You will note from this statement that during the five and one-half years covered the losses aggregate the enormous sum of $1,492,214. You will also note that operating expenses were barely met in the years 1918, 1922 and for the first six months of 1923, but that even bare operating expenses were not made by a very large margin during the years 1919, 1920 and 1921, and with the recent wage increase our reports again show the company's failure to make ends meet, to say nothing of any return upon our valuation. In other words, the company is actually paying people to ride on its cars.

"It is the general impression that one-man operation should overcome car difficulties, but it should not be overlooked that trainmen's wages alone are not a controlling element in the cost of operation. Even if this were true, the expense for platform labor with one-man operation at 58½ cents an hour is greater than it was for two-man operation at 28 cents an hour paid in 1913.

"We believe we are operating our system as economically as possible with the present service, as is evident from a comparison of our operating expenses for 1922 (25.2 cents per car-mile, or 29.5 cents including taxes) with the average for 121 urban railways of the country reporting for the year 1922 (32.8 cents per car-mile, or 36.2 cents per car-mile including taxes). Our operating cost is less by 23.1 per cent than the average of street railways of the country, despite the fact that our power consumption is much higher than that of most cities on account of the very numerous and heavy grades.

"A study of the electric railway service furnished will show plainly that there is in Davenport a very large amount of duplicate track. The track in Davenport is far in excess of the city's requirements, as shown by our 1 mile of track to 1,059 persons, compared with Chicago's 1 mile of track to 2,555 persons. Our investment in track, therefore, considered in relation to population, is two and one-half times that of Chicago.

"That our losses, as shown by the statement referred to, cannot continue requires no argument. But, bad as this is, it is not the whole story. With an investment of substantially $4,000,000 in a public service which does not even pay its actual operating expenses, the company, if it remains in business, is confronted with the necessity of spending in the next two years $500,000 of new capital in pavement and replacement of tracks required by new paving. This expenditure will add nothing to the earning ability of the property, and as a business proposition might just as well be written off the company's books the moment it is spent. Were the money placed in a package and dropped into the Mississippi River, its loss could be no more certain or irreparable to the company under present conditions. I think we need not say that this is an impossible business situation.

"The Tri-City Railway is now in default upon its interest payments to the amount of more than $182,000. It has not paid a dividend since the year 1918, though more than one-half of the actual investment is represented by stocks. For the past five years it has been carried solely by its stockholders, who have foregone dividends and paid from their own pockets its bond interest and its actual operating deficits. This they can no longer do, as it is apparent from the constant failure of patronage that no relief is possible without enlightened and prompt public action. A receivership would be of no value for the reason that the company does not earn its operating expenses, and receivers have no funds with which to pay deficits. There is, therefore, no alternative save prompt relief or complete abandonment.

"As a business man, you will not fail to appreciate the reluctance with which we admit our inability to cope with the problems of our own business. Our apology must lie in the fact that under the laws as they now stand, we are not permitted to limit our service to the demand therefor; to fix the charge for that which we sell, or to work out, as other business men may, plans by which our patronage may be increased and our expenses reduced. We must and do submit to public control and regulation, but it is not unfair to suggest that public control places large responsibility upon the public, and when a publicly controlled business has reached the point where it can no longer function, the public must take a hand in its reestablishment. Otherwise the inevitable will occur and the business succumb.

"Another installment of bond interest will soon be in default, and we are, therefore, forced to the conviction that unless some plan for relief can be worked out within a reasonably short time (ninety days, at the most) there is no alternative save to turn the property over to the creditors to obtain what they can from the salvage of the physical properties. In the meantime, it is clear that the company is absolutely unable to proceed with any of improvements now contemplated.

"We, therefore, take the liberty of urging you, as the chief executive and first citizen of Davenport, to lay this matter fully before the city government; the people, and the civic bodies and other organizations interested, to the end that some concerted action may be taken looking to a study of the problem and its possible solution.

"We shall co-operate in every way possible with you and such other persons as may lend their aid. I need not state that our books, records, and all of our operations will be open to any person or persons whom you may wish to have investigate them with a view either of verifying our figures or assisting us in working out a plan under which the street railway may be saved.

"We assure you that our decision to discontinue service has not been reached hastily, but only after full consideration and a complete realization of the sacrifice involved in the abandonment of our investment in this community."

Court Cases Argued

Decision Reserved on Plea of State for Appointment of Receivers for Public Service Railway

Moves and counter moves of a legal nature have become the order of the day in connection with the cessation of service by the Public Service Railway. Up to the time of the cessation of service by the railway on Aug. 1 the company was operating at an 8-cent cash fare, with four tokens for 30 cents. This rate was established by the court on appeal of the company from the order of the Board of Public Utility Commissioners fixing the cash fare at 7 cents, with one cent for a transfer. At the time, the company was actually seeking a 10-cent cash fare. When the company announced its willingness to operate at a 7-cent fare, providing it were allowed to absorb competing bus lines, the commission filed a motion in the United States District Court asking dismissal of the suit for a fare higher than 7 cents.

CLAIMS COMPANY WANTS PUBLIC FORCED INTO ACCEPTANCE

The commission charged that the only reason the company is not operating is because it hopes that if it can continue to withhold service, the people will accept terms imposed by the company. The contention of the commission was in short that the railway's plan of settlement involved the placing of the problem of rates upon a new basis and constituted an abandonment of the very remedy the railway sought in its appeal to the Federal Court from the commission's order fixing the fare at 7 cents.

The court denied the board's plea. Judge Rellstab assumed, he said, that if it were not for the strike the company would still be operating. Because the company went into other matters such as jitney competition in suggesting a plan of settlement is no reason, he said, why it should be deprived of the benefits of the testimony taken in the federal rate case.

"If the company were freed of jitney competition," Judge Rellstab said, "there still would remain the questions of rates and values which were bound to come up again."

The court then took up the question of fixing a date for argument on exceptions taken by the Utilities Commission and the Public Service to the report filed by Special Master Haight.

After discussion, Sept. 25, 26 and 27 were set aside for the argument.

The report of Mr. Haight, which in effect justifies the 8-cent fare, is now before Judge Rellstab for approval. Numerous exceptions to the report have been taken in behalf of the Public Utilities Commission and contesting municipalities and by the railway. In general the contention of the commission is that the valuations accepted by Mr. Haight were too high, while the railway company contends they were too low.

On Sept. 12 Frank Bergen, general counsel for the railway, appeared before Chancellor Walker at the State House to show cause why a mandatory injunction should not be issued against the company compelling it to operate its cars, or, in the alternative, why a receiver should not be appointed for the corporation.

He stated that such applications made by Attorney General McCran should not be granted because the strike of the employees was beyond the control of the company, and that actions brought in the Court of Chancery on Sept. 4 by Mr. McCran should first be decided in the Supreme Court.

In its answer the railway declares that it has made and is continuing to make an adjustment with its striking employees, and that every reasonable effort is being made to resume service. Mr. Bergen contended that the strike settlement plan advanced by the railway, in which it offered its employees a 20 per cent increase in wages and proposed a 7-cent fare with 1 cent for a transfer would bring about a resumption of service.

Attorney General McCran, who made the request for the injunction on the alternative receivership, was present at the court hearing on Sept. 12. It was he who at the request of Governor Silzer filed with the court an information in which he set up that the Public Service, a debtor of the several municipalities in which it operates, had failed during August to earn anything toward meeting its debts.

RESUMPTION OBJECT OF COURT ACTION

The purpose of the action in Chancery Court was to bring about a speedy resumption of service if that could be accomplished without the necessity of first accepting in full the plan of settlement advanced by the railway. Other legal proceedings have been instituted, but they are of a kind that run on indefinitely. Quo warranto proceedings were started, for instance, and the company must show cause on Sept. 14 in the Supreme Court by what right it occupies the streets with its tracks when it is not giving the service implied under the terms of its franchises.

Many questions of law are involved in the several court proceedings, and little hope is held out for an early decision. It may be that a decision in the so-called Fast Line case, namely, that of the Public Service Railroad, will come early because the law is believed to be more clearly defined than in the case of the Public Service Railway. The decision, when rendered, is appealable to the Court of Errors and Appeals.

Public Service Railway turned over to Director Howe of the Department of Revenue and Finance of Newark on Sept. 10 a check for $290,003 in payment of the special 5 per cent tax on revenue derived from passenger traffic within the city of Newark. This special tax is imposed on the company under an ordinance which dates back to horse car days, permitting the substitution of electricity for horses as a motive power for street cars. Subsequently the State Legislature extended the principle of the Newark idea and imposed a franchise tax of 5 per cent on the company's gross receipts in all municipalities.

The franchise tax, which this year aggregates nearly $1,100,000, although imposed by the state, is payable directly to the communities in which the railway is located and the money is available for local municipal purposes. To this extent the money paid Newark, as well as the other municipalities, is, in effect, a levy upon the street car riders for the purpose of helping to keep down local tax rates.

Since Newark began imposing the special tax in 1894 the car riders have contributed the sum of $4,252,500 toward the defraying of city expenses in Newark alone. The first year the payment was $31,097, and in less than thirty years it has increased nearly tenfold. The check tendered on Sept. 10 exceeded that of ten years ago by more than $120,000 and calls for $90,000 more than was paid five years ago.

Officers' Salaries Increased

Executives of Detroit Municipal Lines Receive Wage Increases Totaling $14,040 a Year

Salary increases for a number of executives and office men employed by the Detroit Department of Street Railways have been announced by the Board of Street Railway Commissioners. They follow closely upon the decision of the arbitration board granting wage increases to the platform employees. It will be recalled that the railway management felt called upon to increase fares on the city lines as a result of the advance to trainmen. The increases granted to thirty-three of the executives and office employees are a part of the added expense to which reference has been made.

The salary boosts granted the employees were reported as ranging from 10 to 25 per cent. The executives affected include the auditor, superintendent of tracks, superintendent of transportation, claims attorney, assistant superintendent of equipment and supervisor of supplies. It is estimated the additional expenses of the department due to the salary increases will be $14,040 a year.

The resolution introduced into the Council by Councilman Kronk, calling on the chairman of the board of arbitration and members of the Board of Street Railway Commissioners to appear before the Council and explain the necessity for a higher rate of fare was shelved temporarily after it had been pointed out that an amendment to the city charter simply requires the Board of Street Railway Commissioners to report its findings to the Council annually and at such other times as the Council may direct. It was contended that the annual report should be all that the Council should ask for unless the report was of an unsatisfactory nature. The annual report is in the hands of the printers.

On the other hand, it was cited by Councilman Kronk that citizens and taxpayers, through their duly elected representatives in the Council, are assured an insight into the workings of the various departments under a section of the charter which says that one of the powers and duties of the Council shall be to require at any time, by resolution, full and complete information from any officer, board or commission, concerning the conduct of affairs in his or its charge.

The new rate of fare which went into effect following the granting of the wage increase for trainmen is 6 cents for cash fares or nine tickets for 50 cents. The 1-cent charge for transfer still holds as before, making passengers who transfer pay 7 cents to complete their ride.

City Council Orders Plans for Subway System

The City Council of Los Angeles on Sept. 7 adopted a resolution, which was forwarded to the City's Board of Public Utilities and the City Engineer, containing instructions that plans be prepared for a comprehensive subway system for Los Angeles. It is stated that immediately after receipt of the plans by the City Council, steps will be taken for the early construction of the proposed subway system.

It is indefinite whether such a subway system shall be built under bond issue by the city itself or financed by the railway companies. This question is to be decided later.

Director Twining's Remarks Attract Attention

Wide publicity has been given in Philadelphia and in New Jersey to comments on the present transit situation made by William E. Twining, director of the department of city transit in Philadelphia, in a letter to Mayor Moore of that city dated Sept. 4. Mr. Twining's letter to the Mayor accompanied records compiled by his department pertaining to new franchises which have been granted to the Philadelphia Rapid Transit Company during the present city administration.

Mr. Twining pointed out that although the twelve-year period since 1910 shows a slight increase in the operating track of the subsidiaries of the Philadelphia Rapid Transit Company, the records show that since the beginning of the city administration in 1920 there has been an actual decrease of trackage of subsidiaries to the amount of more than 8 miles. He said that this fact, taken in connection with the company's proposal to abandon a large amount of surface track mileage in the business section of the city and to substitute therefor subways and bus lines, may be considered as indicating that the time is not far distant when surface track will be a curiosity and will simply mark one stage in the evolution of city transportation.

Mr. Twining feels that these remarks by him have attracted public attention far beyond their importance. As he sees it surface tracks have reached the point where development of them has stopped. His idea is that the motor bus, partaking of the nature of both the trolley car and the automobile, seems destined to fill a large place in city transportation in the future.

M. O. Advocates Attack Private Operation

At Meeting of Public Ownership League Addresses Favoring Municipal Control of Utilities Were Presented

One hundred delegates from all over the United States attended the convention of the Public Ownership League of America, which was held at Toronto, Sept. 10, 11 and 12, under the presidency of Willis J. Spaulding, Commissioner of Public Works, Springfield, Ill.

President Spaulding asserted that municipalities in the United States are beginning to realize that they will have to act quickly if they are not to find themselves permanently under the control of large private syndicates operating public utilities. It is becoming increasingly difficult, Mr. Spaulding said, for cities to launch their own publicly owned light and power systems.

The secretary of the league, Carl D. Thompson of Chicago, quoted extensively from United States papers and periodicals in an endeavor to show that private enterprise is quickly getting control of the great water-power resources of the States.

Jerome Frank, special corporation counsel of Chicago, stated that Chicago was considering the purchase of its entire street transportation system. The price may be $100,000,000 and a program of improvements and extensions for the next twenty years will be about $400,000,000. The present owners are asking about $240,000,000 for their holdings.

Cornelius Sheehan, commissioner of gas, water and electricity, New York City, in the course of an address on the failure of regulation, severely condemned various financial practices of the private railway interests in New York City and told how the agitation was started to have the city build and operate its own subway system. He said the city was now holding itself in readiness to recover possession of its transit lines, including the subways, in 1925 and 1926 at the expiration of the present franchises.

George Wright of the Toronto Transportation Commission, gave the history of the Toronto street railway system and the improvements made since the city took over the road in September, 1921. In United States cities 42 per cent have fares higher than Toronto. He believed that subways presented a problem in Toronto which would soon have to be faced. Mr. Wright emphasized that the local system was entirely free from political influence, that the citizens were behind the commission, and that the most modern track, rolling stock and carhouses had been built. The system had been declared the finest on the north American continent.

Charles Edward Russell, New York, gave the history of progress of public ownership in Great Britain, predicting that within fifteen years all public utilities there would be municipally owned.

News Notes

Radio Talks Scheduled.—The following McGraw-Hill editors will talk during the month of September from 8:15 to 8:30 from the broadcasting station at Aeolian Hall, New York City: H. C. Parmelee, editor Chemical & Metallurgical Engineering, on Sept. 19 on "The Work of the Chemical Engineer"; E. J. Mehren, editor Engineering News-Record, on Sept. 26 on "What Engineering Is and What It Is Not."

Jitney Violators Fined. — Supreme Court Justice Crasper on Sept. 10 imposed a jail sentence of fifteen days on five jitney operators guilty of operating in the city of Schenectady in the face of the restraining injunction, fined three others in amounts ranging from $50 to $250 and dismissed one case for lack of evidence. Judge Crasper is the fourth Supreme Court Justice in the judicial district to be drawn into the jitney controversy. Judge Crasper signified by his attitude that there would be no further toleration on his part. He said that an order of the Supreme Court must be obeyed or there would be no government. The Schenectady Railway will continue its campaign against jitney operators and violators of the injunction will be brought into court as soon as possible.

D. U. R. Ordered to Tear Up Tracks.—A resolution passed unanimously by the Council of River Rouge directs the Detroit United Railway to tear up its tracks and remove its wires inside the city within ninety days or have it done by the city at the expense of the company. A penalty was fixed at $250 a day for failure to carry out the provisions of the ordinance. This action follows the granting of an injunction to River Rouge by Circuit Judge Theodore J. Richter, enjoining the Detroit United Railway from running cars through the city. The injunction was asked after the company had increased the fare for city rides. Mayor Bresnahan of River Rouge proposes to depend upon bus lines to replace the cars until municipal ownership of the car lines can be effected. The bus fare will continue at the rate of three rides for 10 cents. It is the Mayor's idea to have the company put a price on its lines in River Rouge and if the price is agreeable the city will purchase the lines and lease them to the Detroit Department of Street Railways. This he cites will provide direct through service to the Detroit City Hall.

Foreign News

German Railways Fail

Unable to Meet a Daily Deficit of 50,000,000,000 Marks, Berlin Railways to Cease Operations

The socialization of the street railway system of Berlin has proved a dismal failure and as a result it was determined to shut down the system on Sept. 7. Before the war the street railway system of Berlin was in private hands, but a year before hostilities began the system was acquired by the municipality. From then on things went from bad to worse. The war began and copper feeders and trolley wires were seized for war purposes. When the war terminated the copper was replaced, but many lines were abandoned and the rolling stock and the track equipment were in great need of repair.

POLITICS PLAYS PART

Meanwhile, however, the municipal government fell into the hands of the Socialists, with the result that politics played a most important part in the operation of the street railway system. The working day was reduced to eight hours, the number of departments increased about fivefold and the office force fourfold. Platform men were chosen not because of experience but by political preference. The overmanning of the system, whereby twice as many men were employed as before, was largely attributable to conditions incident to the disbanding of the German army. It was necessary to find work for the officers, and they were given office positions with the municipal railway or acted as inspectors.

The expenses of the street railway system because of this necessarily exceeded peace-time costs, while the income, as measured in marks, remained stationary. The crisis came when the mark began its phenomenal decline. Wages were increased from 40 pfennig (10 cents) an hour to 490,000 marks an hour ($125,000 before the war) but approximately 20 cents at the time, or nearly 25 per cent higher than the dollar-mark rate). Fares were also increased to 100,000 marks, or about a million times the pre-war rate. The increased fare even with the depreciated mark caused the public to boycott the street railways and turn to the elevated roads and subways, with the result that the street railway system began to pile up a deficit of from 50,000,000,000 to 60,000,000,000 marks daily.

The elevated and subways systems of Berlin are operated by a private concern, and it is stipulated that the subway and elevated railway fares must equal the street railway fares. Thus not only were more passengers forced on the elevated and subway lines, but inasmuch as these were always operated at a profit at the regular fare, because the roads were not overmanned and were also kept in better condition, the profits became enormous.

Efforts were made to get the federal transport ministry to advance funds to make up the deficit but without avail, the government itself having very little funds. Arrangements were finally made whereby private individuals, with the assistance of the government, undertook to place the railways on a paying basis. The only possibility of doing this was to curtail the number of employees, and this was best done by discharging the whole force. Two weeks notice was therefore given to every employee that on Sept. 7 his services would no longer be required. The plan was to stop the entire street railway system on that day, possibly for a week or only for a day.

The new company to be formed will then hire men according to their ability, will make a new contract for electricity supply at a better rate than that now obtaining and will discard non-profitable routes and map out new ones. The old cars will have to be used as no funds are available for new ones, but they will be kept in better repair. It is hoped that possibly the same company which operates the elevated and subway lines can be induced to take over the surface lines also.

Throughout Germany, particularly in the smaller cities, street railway service had been abandoned altogether and people have taken to walking again or, when they can afford it, employ bicycles.

Electrification Will Come Up for Discussion

During this month the matter of pushing the electrification program of the Swiss Federal Railroads will come up for discussion. Although it is believed but not proved that electric operation is cheaper in Switzerland than steam, carrying on the electrification program will increase, it is said, the debt charge, which is already a heavy burden.

French After Greek State Railways

It is rumored in Paris that a French company is in pourparlers with the Greek government for the taking over of the state operated Greek railway lines and electrifying them. The Compagnie de Construction des Batignolles has already had a hand in the construction of a considerable kilometrage of line in Greece and is said to be interested in the operation by an all-embracing French company which shall take the lines over from the Greek government authorities, who appear to have made a mess of them.

Halfpenny Fares in Glasgow

The Glasgow Corporation Tramways Committee on Aug. 1 carried a motion by fourteen votes to nine in favor of restoring halfpenny fares for short journeys. The decision now has to come before the Town Council for confirmation or rejection. The halfpenny fare was started when the corporation took over the tramway system from the old tramway company in 1894 and subsequently the distance given for this fare was doubled. In 1920, owing to increased working expenses, the halfpenny fare was abolished, but twelve tickets for the shorter distance could be bought for 9d.

Manchester Prefers Trams

The Town Council of Manchester has rejected by a large majority a motion to the effect that, having regard to the great congestion of traffic in the center of the city, the Tramways Committee should be instructed to discontinue the running of cars in Market Street and to replace them by buses, and to consider the desirability of substituting buses for tramcars in other congested streets.

Reconstruction of London Underground Stations

Further particulars are now available on the rebuilding plans for two important stations of the London Underground electric railways. The growth of traffic at the important center, Piccadilly Circus, has made the construction of a new station imperative. In 1907, which was the first complete year of the station being open for traffic, the number of passengers using it was 1,500,000. In 1922 the number using it was 18,000,000. The new station will be 15 ft. below the street level of the Circus. It will be elliptical in shape, with a large circulating area, from which separate escalators will connect with the Baker Street & Waterloo Railway and the Great Northern & Piccadilly Railway, which cross one another (at different levels) at this point. In all there will be six escalators, a record for any one station, and three will feed each of the two railways. The center escalator in each group will be reversible, so that during the busy hours two in each group can be run in either the upward or downward direction. The new station will embody every form of time-saving device. A broad subway under the Circus, encircling the booking hall, will be a feature. The subway will be available for the general public for crossing the Circus in safety. In this and in other respects the scheme resembles that which has been in successful operation for a number of years at the Bank of England, where three underground railway stations are embraced in the arrangements.

In regard to the reconstruction of Westminster Station, matters are further advanced, and it is hoped that the work will be completed by October.

Financial and Corporate

Reorganization Before Commission

Trustees Who Purchased the Key Route Properties Under Foreclosure Seek Approval of Financing Plan

Hugh Goodfellow, Warren Olney and W. I. Brobeck, as trustees, and the Key System Transit Company, East Oakland Railway, Oakland & Haywards Railroad and Key System Securities Company have applied to the California Railroad Commission for authority to transfer and acquire the property formerly belonging to the San Francisco-Oakland Terminal Railways and to issue securities in conformity with the plan of reorganization as submitted in detail to the commission. This is one of the final moves in connection with the reorganization, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL.

The application recites that the trustees on July 17, 1923, purchased at judicial sale under a decree of foreclosure all the properties of the San Francisco-Oakland Terminal Railways, consisting of interurban railway and ferry system, commonly known as the Key Route or the Key System, and the street railway system operated between the cities on the east side of the bay.

OWNERS DEPOSIT BONDS

It is stated that the owners of more than 97 per cent of the face value of all of the outstanding bonds have deposited their bonds under the plan of reorganization submitted to the commission. The property was purchased at foreclosure on a bid of $10,000,000, of which $398,165 was in cash and $9,601,834 by credit, indorsed pro rata upon the bonds so deposited; that the sum of $283,561 was paid as the pro rata share of the bondholders who had not deposited their bonds as aforesaid, and the sum of $114,603 was paid to meet the expenses of the foreclosure proceedings and sale in accordance with the terms of the foreclosure decree.

The total capitalization against the properties prior to foreclosure was $48,879,000, it is stated, represented by eleven bond issues totaling $16,401,000, three issues of equipment bonds and notes totaling $703,000, three classes of stock totaling, in par value, $28,175,000, and notes totaling $3,600,000 issued by two subsidiary companies. Interest unpaid upon bonds deposited in the reorganization plan amounted to $3,226,490 July 1, 1923.

It is proposed to reduce the capitalization against the properties to approximately $28,237,500, divided as follows: First mortgage bonds, $2,500,000; refunding bonds, $9,416,000; preferred stock, $12,829,000; common stock issued pro rata to holders of preferred stock, $3,262,500; common stock issued to holders of dividend note, $250,000.

It is estimated that the yearly bond interest charges under the reorganization plan will not be in excess of $800,000, whereas the net earnings of the properties, after paying taxes, have averaged approximately $1,800,000 a year for the past three years.

Floating indebtedness of the San Francisco-Oakland Terminal Railways as of June 30, 1923, was as follows: Audited vouchers for current accounts payable, $248,265; audited payrolls, $124,648; miscellaneous operating items, $64,196; prior mortgages on real estate, $22,500; notes due banks, $69,500; money due the Realty Syndicate for two pieces of real estate, $119,206. It is proposed to pay this floating indebtedness in full. The reorganization committee states that it refused to recognize the validity of six non-interest bearing notes aggregating $357,924 representing amounts payable on dividends declared by the company but not actually paid.

A settlement upon the claims of said notes has been arranged whereby all the notes, other than the one pledged as security for the so-called Halsey note, are to be surrendered and canceled in consideration of the issuance to the holders thereof of $250,000, par value, of common stock of the new corporation.

It is proposed to organize four corporations in consummating the plan of reorganization as follows: Key System Securities Company, authorized capital stock $2,600,000; East Oakland Railway, authorized capital stock $250,000; Oakland & Haywards Railway, authorized capital stock $250,000, and Key System Transit Company, authorized capital stock $17,750,000.

It is proposed that the Key System Transit Company shall serve as the principal company which shall own directly or indirectly, and shall operate, the properties of the San Francisco-Oakland Terminal Railways purchased at foreclosure sale of aforesaid trustees. This company will own and hold all the stock, except qualifying directors' shares of the three subsidiary companies, and will lease and operate the properties of the two, which are to acquire operating railroad properties, namely, East Oakland Railway and Oakland & Haywards Railway. The trustees will convey to the Key System Transit Company all properties acquired by them at the foreclosure sale, except such properties as are to be transferred to subsidiary companies.

Authorization of the Railroad Commission is asked by the trustees to carry out the terms of the reorganization plan through the transfer of property, the issuance of the proposed authorized capital stock and to issue bonds in the sum of $229,000 in exchange for bonds of Twenty-third Avenue Electric Railway 6 per cent bond issue, the issuance of bonds in the sum of $236,000 in exchange for bonds of Oakland, San Leandro & Haywards Electric Railway first mortgage 6 per cent bond issue, in addition to issues heretofore outlined including first mortgage bonds of $10,000,000 and general refunding bonds of $20,000,000.

Stock Selling Campaign Nets Good Results

Results of a most gratifying nature were obtained in the stock selling campaign among employees of the Illinois Power & Light Corporation which began on Aug. 13 and ended two weeks later. According to figures made public at the close of the campaign by E. Paul Young, head of the investment department of the corporation, more than 2,600 employees bought stock during the two weeks it was offered, bringing the total number of shareholders in the company up to 3,000, out of 5,550 workers employed.

The stock is first preferred 7 per cent cumulative at $95 a share. Much of it was purchased by employees under a specially arranged partial payment plan. Six hundred workers on the interurban division of the Illinois Power & Light Corporation alone bought more than $100,000, par value, of the stock.

Surplus of $23,086 in Barcelona

According to the eighth annual report of the board of directors the Barcelona Traction, Light & Power Company, Ltd., for the year ended Dec. 31, 1922, the company earned a surplus of $23,086. The revenue was $2,575,466 and the expenses, including administration and general reorganization and issue expenses, amounted to $340,241. After interest payments on various bonds a balance of $738,359 remained available for interest on first mortgage bonds. The amount of interest paid on these first mortgage bonds was $715,273, which left a surplus balance of $23,086. This compares with a deficit for the period ended Dec. 31, 1921, amounting to $156,872 and a deficit of $179,390 for the year 1920.

The report states that the operating results of the tramways company showed an increase in gross earnings of 7.69 per cent and in net earnings of 14.10 per cent over those of the previous year.

During the year a bus company secured a concession and began operation, while the tramways company itself is introducing buses on certain routes.

Referring to taxation, the report makes mention of the fact that a very heavy and unexpected impost was made upon the railway companies. Further, that the companies had appealed to the courts and that the case was pending.

Final Step Taken in Brooklyn Reorganization

Representatives of the Brooklyn Rapid Transit Company, now operating as the Brooklyn-Manhattan Transit Corporation, have asked the Transit Commission for its approval on the five mortgages that cover the property. These mortgages as presented to the Transit Commission mark the final step in the reorganization of the B. R. T.

The mortgages are simply a formal step in the reorganization necessary to protect the interests of certain security holders, and were prepared according to the plan made public on March 15, 1923. The approval by the commission of these mortgages will be followed at once by a notice by the Brooklyn-Manhattan Transit Corporation calling for all claims in the Malbone tunnel disaster, which involve approximately $2,000,000. The majority of these claims have been liquidated, and it is said by representatives of the company that they will be paid in cash when the date has been set for payment. According to the present indications the claims will all be paid off before the end of September.

The second move on the part of the corporation, once the mortgages have been approved, will be to set a day for the exchange of the certificates of deposit, representing securities that have been surrendered to the reorganization committee, for the new stocks and bonds of the Brooklyn-Manhattan Transit Corporation. This is also expected to be accomplished before the end of September.

Approximately 85 per cent of the stock of the Brooklyn Rapid Transit Company has been deposited under the reorganization plan and on the majority of these shares the three installments totaling $35 a share have been paid according to the plan.

Among the projects that the plan, which will be closed by the approval of the commission on Thursday, proposed to accomplish through a reorganization are the following:

The funding into long term 6 per cent bonds of more than $60,000,000 of short term obligations, most of which carry 7 per cent interest.

The payment in part and the adjustment of the balance of the accumulated arrears of interest, amounting to more than $27,000,000, on the bonded debt of the system so as to permit the resumption of payments of current interest.

The payment in cash of the principal amount of the tort claims for personal injuries, as allowed, estimated at approximately $2,200,000.

The adjustment of the claims of the general contractor creditors, as allowed, estimated at approximately $1,600,000.

The payment of receiver's certificates and other claims against the property aggregating more than $12,000,000.

Seattle Shows Profit in July

An audit for the month of July, completed recently, shows that the Seattle Municipal Railway made a profit of approximately $13,000 for the thirty-one days over all expenses, including depreciation, interest and bond redemption. The net income for July was $83,265, or $3,000 more than for the same period in 1922. An allowance of $70,250 for bond redemption is not made in that figure.

Economies in operating expenses were largely responsible for the good showing in July this year. According to Superintendent D. W. Henderson, the cost per car-mile in July, 1922, was 29.47 cents, while in the same month this year it was 28 cents. Gross receipts during July were $543,591, an increase of $4,777 over July, 1922. Operating expenses, including depreciation, but not interest and bond redemption, increased $4,000, due to increase in the number of car-miles operated this year as compared with last year.

The number of passengers carried in July, 1923, increased 8,312 over July of last year. The heavy falling off in car riding, as the result of an increase in fare from 5 cents to 8⅓ cents, affected the standing of the lines, for although the lines carried 654,490 fewer passengers in July than in May, when the 5-cent fare was in effect, the revenue increased from $373,000 in May to $543,591 in July.

Final Argument in Denver Case Oct. 8

The controversy between the city of Denver and the Denver Tramway over fares has entered upon the final stage. The city and the tramway went into court on March 12, the city seeking to have the 8-cent fare granted by Federal Judge Lewis set aside and either a 6-cent or 5-cent fare instituted. The franchise specifies a 5-cent fare. Both sides closed for the present on Sept. 7, Henry A. Dubbs, special master in chancery, having informed the attorneys to get down to business and the law. The oral arguments were set for the week commencing Oct. 8. The case will then be taken under advisement and a decision probably rendered before the new year.

The financial statement of the tramway for the first seven months of 1923 shows net income of $117,351, which is $144,379 less than the same period for 1922.

Guarantee by Holding Company Saves Investors

An investor in the Jersey Central Traction Company concerned about the recent discontinuance of service and the proposed scrapping of the road recently asked the American Investors' Service what was the best procedure for a bondholder of the line to pursue. The answer of the paper is a striking commentary on the value of a security with a strong guarantee behind it, the guarantee of a holding company controlling widely diversified properties. The answer of the paper to the inquiry was as follows:

> The Jersey Central Traction 5s are guaranteed for principal and interest by the American Electric Power Company, successor of the American Railways and the 6s (American Railways-Jersey Central Traction collateral trust 6s, due 1947) are secured by the stock of the Jersey Central Company, and are a direct obligation of the American Railways.
>
> It would seem as long as the American Railways paid interest on these securities that there would not have to be any definite position taken on the bonds, as the assets of the Jersey Central Traction Company are of little value. It could not be said that the company had taken away anything from the security, and in fact the only security the bonds have had is their affiliation with the American Electric Power Company.
>
> We think holders of these bonds should consider themselves very well off to have their interest paid and principal provided for at maturity, as it can readily be seen that if it were an independent property there would be considerable loss, if not a total loss, facing the holders. We are officially informed that the company will make no disposition of the bonds except to let them run to maturity.

CONDENSED STATEMENT OF DENVER TRAMWAY DEC. 24, 1920, TO JULY 31, 1923

	Accumulative Dec. 24, '20, to Dec. 31, '22	January	February	March	April	May	June	July	Accumulative Dec. 24, '20, to July 31, '23
Operating revenue:									
Transportation	$9,515,930	$402,023	$363,014	$407,929	$378,117	$394,318	$381,646	$384,835	$12,227,815
Rental, power, etc.	312,437	12,740	12,319	13,718	16,120	16,092	14,813	15,585	413,825
Total operating revenue	9,838,367	414,763	375,333	421,697	394,237	410,410	396,459	400,421	12,641,640
Operating expenses:									
Way and structures	1,362,033	45,799	48,052	47,670	48,189	47,132	53,047	55,425	1,707,346
Equipment	920,855	37,924	34,869	43,405	34,900	33,051	34,979	28,251	1,169,504
Power	724,400	35,365	29,376	32,286	29,670	29,712	28,262	28,325	937,378
Conducting transportation	2,863,785	118,464	109,747	118,721	112,990	118,253	113,598	117,576	3,673,135
General and misc.	694,463	27,856	36,276	41,303	40,100	47,059	36,517	37,665	961,175
Total operating expense	6,365,437	265,409	259,320	283,384	265,849	275,207	266,443	267,510	8,448,558
Net operating revenue	3,262,930	149,355	116,013	138,263	128,388	135,203	130,016	132,911	4,193,082
Miscellaneous income	23,679	1,095	1,159	1,509	865	820	851	1,062	31,041
Gross income, less operating expense	3,286,609	150,450	117,172	139,772	129,253	136,023	130,867	133,973	4,224,123
Deductions:									
Taxes	757,166	32,117	32,117	32,117	32,117	32,117	32,117	32,117	981,983
Franchise payments	121,210	5,000	5,000	5,000	5,000	5,000	5,000	5,000	156,210
Interest on debts	1,960,204	79,675	79,675	79,675	80,757	80,306	80,126	80,126	2,520,543
Total deductions	2,838,580	116,792	116,792	116,792	112,874	117,423	117,243	117,243	3,658,736
Net Income	$448,029	$33,658	$380	$22,980	$11,379	$18,600	$13,624	$16,730	$565,387

Initial Illinois Power & Light Dividend—I.T.S. Common Pays

The Illinois Power & Light Company, Chicago, declared initial quarterly dividends of 1¾ per cent on the 7 per cent cumulative preferred and 1½ per cent on the 6 per cent cumulative preferred stock, both payable Oct. 1 to stock of record Sept. 15. The company has made application to list its 7 per cent cumulative preferred stock on the Montreal Stock Exchange. There is $20,000,000 of this issue authorized.

At the same time the Illinois Traction Company, now affiliated with the Illinois Power & Light Company, in addition to declaring the regular quarterly dividend of 1½ per cent on the 6 per cent cumulative preferred stock, also declared a dividend of 50 cents a share on the common stock, payable Oct. 15. This is the first dividend on the common stock since 1918.

Commission Fixes Utilities' Valuation

The Missouri State Tax Commission on Aug. 30 recommended that the valuation of all railroads and public utilities in Missouri be assessed for 1923 taxes at $385,632,258, an increase of $2,369,025 over the value finally fixed by the State Board of Equalization last year. Of the St. Louis utilities decreases were ordered in the assessments of the United Railways and the Terminal Railroad Association. For St. Louis alone the United Railways' value was fixed at $44,085,208 compared with $44,267,889 last year. The Terminal's properties were valued at $13,093,698 against $13,763,898 last year.

The total value of all of the properties in Missouri, including railroads, public utilities, land and personal properties, is $4,361,609,835. The $385,632,258 valuation of railroads and other public utilities is made up as follows: Steam roads, $274,506,562; street and electric interurbans, $66,008,581; bridges, $6,969,964; telegraph, $6,423,497, and telephones, $31,743,664.

Right to Issue Ten-Year Bonds Sought.—The Washington Railway & Electric Company, Washington, D. C., has asked the Utilities Commission for authority to issue $2,496,000 of 6 per cent ten-year bonds dated Nov. 5, under a $10,000,000 general mortgage. Part of the issue would be used to retire other bonds of the company.

Auction Sales in New York.—At the public auction rooms in New York on Sept. 12 there were sold $1,000 Augusta-Aiken Railway & Electric Corporation 5 per cent sinking fund bonds, due December, 1935; decrease, 1923, and subsequent coupons attached; also detached coupons due June and December, 1922, and June 1923, for $25 each; $150 Augusta-Aiken Railway & Electric Corporation 5 per cent bond, due June, 1924; $510 lot.

May Abandon Service. — Losing steadily, the car service of Anderson may be abandoned, according to Harry A. Orr, manager of the system. For the first five months of this year the loss has been $7,051. This is not including depreciation, overhead, taxes and bonded interest. The system is operated by the Southern Public Utilities Company, a subsidiary of the Southern Power Company.

Net Operating Income $341,228.—The gross earnings of the Chicago Surface Lines for July were $4,746,503 and the operating expenses were $3,650,024. The net operating income was $341,228. The wages included in the operating expenses are only the wages already paid. Under the award of the board of arbitration, made on July 20, 1923, back pay from June 1 to July 31, 1923, was to be computed and paid in August, 1923.

Extra Common Dividend Declared.—The United Light & Railways Company, Grand Rapids, Mich., has declared an extra dividend of three-quarters of 1 per cent on the common stock in addition to the regular quarterly dividend of 1¼ per cent, both payable Nov. 1 to stock of record Oct. 15. Regular quarterly dividends of 1½ per cent on the first preferred and of 1¾ per cent on the participating preferred were also declared, both payable Oct. 1 to stock of record Sept. 15.

Will Pay Liquid Dividend. — The Union Trust Company of Cleveland is sending out notices to holders of the $800,000 first mortgage 5 per cent bonds of the New York & North Shore Traction Company, issued April 1, 1914, and to holders of certificates of deposit under bondholders' agreement that funds are at hand to pay a liquid dividend at the rate of $50 on each $1,000 face amount of all bonds outstanding under the first mortgage specified above. The bonds must have attached coupons matured April 1, 1919, and thereafter, and must be forwarded to the Union Trust Company at Cleveland.

Another Payment Declared on Income Bonds.—The directors of the Third Avenue Railway, New York, N. Y., have declared the regular semi-annual interest of 2½ per cent on adjacent mortgage income 5 per cent bonds and one-half of 1 per cent on account of accumulated interest, both payable Oct. 1. On April 1, in addition to the regular 2½ per cent then due, one-half of 1 per cent was paid on account of accumulated interest, making total payments 6¾ per cent in the fiscal year ended June 30. Accumulated interest now totals 20¼ per cent. After a lapse of more than four years interest payments on these bonds were resumed April 1, 1922, when 1¼ per cent was paid.

Seeks to Abandon Service. — The Pennsylvania-New Jersey Railway on Sept. 6 asked the Public Service Commission for permission to abandon its service in the territory between Bristol and Doylestown, Pa. J. F. Morris, vice-president of the company, said that the company was now working under a $10,000 deficit and faced a $30,000 payment for paving. Residents of the territory not having automobiles entered a protest against the company's proposal. Mr. Morris said a bus line is to be established between the two points if the electric railway is discontinued. The commission reserved decision. The road is 26 miles long. It was built about thirty years ago at a cost of $250,000.

Will Bring Suit to Recover Taxes.—The Middlesex County Board of Freeholders has instructed Solicitor Richardson to bring suit against the Jersey Central Traction Company to recover $1,080 due the county in franchise taxes. The franchise tax covers a period of six years, at $180 per annum. William Hitchcock, who was general manager of the company, requested the board to accept $650. The traction company ceased to operate some weeks ago. The company has paid no franchise tax to the county for twenty years. A bill was first rendered the company for the twenty years, but it was found the company would escape taxation for fourteen years through the statute of limitations, but that it would have to pay for six years.

Capital Stock Increased.—An increase of $3,000,000 of the capital stock of the Wisconsin Traction, Light, Heat & Power Company, operating street and interurban lines, electric light and power plants and gas plants in Appleton, Neenah, Menasha and many other communities in the Fox River Valley, is announced, the change in the articles of incorporation having already been filed. The original capitalization of the company up to the increase was $1,000,000. A controlling interest in the property was acquired recently by the North American Company, which also controls the Milwaukee Electric Railway & Light Company. John I. Beggs, president of the company, says that funds to be raised by the sale of the additional stock will be used to make needed improvements in and additions to the services which the company is supplying.

Large Operating Revenue.—The report of the Third Avenue Railway, New York, N. Y., for the fiscal year ended June 30, 1923, shows an operating revenue of $14,406,784, against $14,141,412 in 1922. The surplus for the year was $301,275, after allowing for taxes, sinking fund, interest on funded debt, including interest on adjustment mortgage income 5 per cent bonds. This figure is compared with $207,474 for the same period a year ago. The interest revenue derived from cash and investments was $287,348, against $261,537 in 1922. The directors declared a 3 per cent interest payment on adjustment mortgage income 5 per cent bonds, which makes a total payment of 6 per cent out of earnings for the fiscal year ended June 30, 5 per cent regular and 1 per cent on account of accumulated interest. This compares with the payment of 5 per cent from earnings in the preceding year. Interest payments on the bonds were resumed April 1, 1922, after a lapse of more than four years.

Traffic and Transportation

Beeler Report May Be Modified

An effort will be made in the near future to modify the Beeler report with regard to changes recommended therein in the matter of the rearrangement of the electric railway tracks on the neutral ground in Canal Street, New Orleans. This decision was reached after a conference had with Commissioner Paul H. Maloney of the department of Public Utilities, Commissioner Stanley Ray of the Department of Public Safety, Superintendent Earl of the Sewerage & Water Board, representatives of the Public Service, Inc., and a committee that appeared in behalf of the merchants and property owners of Canal Street.

The Canal Street merchants' delegation expressed itself as dissatisfied with the promised relief of traffic congestion in Canal Street, and insisted upon the adoption of some plan that would improve present conditions. It would take two and a half years under the Beeler plan with ordinary procedure, it was said by the spokesman of the delegation, Leonard B. Kieffer, to solve the problem, by which time, he predicted, improvement in the traffic conditions would be well-nigh impossible.

Commissioner Ray, on behalf of the city, declared that while there were some parts of the Beeler report which he was not quite convinced should be adopted, it was imperative that the widening of the gage of the belt lines that traverse Canal Street should be carried out, and that would take up considerable time, together with the widening of the Canal Street roadway and the narrowing of the neutral ground to a two-track width. These changes, he said, would involve rearrangement of the sewerage and drainage pipe, about which the Sewerage & Water Board would have to be consulted before any permanent work could be done.

It was decided, at the suggestion of Commissioner Maloney, that a joint meeting of all parties interested be held in the near future so that some plan of action could be adopted looking to permanent relief. Superintendent Earl, Commissioners Ray and Maloney and Superintendent Paterson of the Public Service, Inc., were named by the Commission Council to the committee.

Middle-Block Stops to Continue in Salt Lake

As a result of a unanimous vote of the City Commissioners of Salt Lake City cars will continue to make stops in the middle of the blocks. The city was requested by the Public Utilities Commission of Utah to act on the question.

This decision marks the end of a campaign to have instituted a new scheme of having cars stop only on corners. The question found its way to the Public Utilities Commission with the request that that body take action. The commission referred the matter to the City Commission, as only Salt Lake City was involved, and the commission considered it of no importance to the remainder of the state.

The principal reason advanced by the public safety officials for recommending the retention of the system in vogue was that Salt Lake City blocks are longer than most blocks in the business districts of larger cities. Arguments used by the opponents of the half-way stops contended that it was unsafe and caused many accidents. Answering this argument the proponents considered it much safer for a car to slow down at the half-block signals.

Ten-Cent Fare in Superior

Fares in Superior, Wis., will be rearranged as well as raised from a 6-cent cash fare and six tickets for 35 cents to a 10-cent cash fare and five tickets for 30 cents following the recent action of members of the advisory council and the City Commission who voted almost unanimously to accept a proposal submitted to that body by the Duluth Street Railway. This ends for the time being the fare rate controversy which has existed for some time between the city and the company.

Other proposals besides the fare question include the acceptance of eliminating all railroad crossing flagging at crossings where flagmen or gates are provided and the curtailment and sterner regulation of local jitney traffic to the advantage of the city, which traffic has made serious inroads in the operation and revenues of the traction company. Without this increase in fares the company would have been forced to give decreased service or go out of business.

Financial figures submitted by the company show that from Sept. 1, 1921, to Aug. 31, 1922, the first twelve months of the 6-cent fare in Superior, the net earnings were only $18,000. The same figures practically prevailed at the end of the second year, which closed the first of this month. The net loss to the company during the past year has been approximately $90,000 per year, because of jitney competition as well as the interest on the large bonded indebtedness which the operating profit has been wholly inadequate to meet.

The new agreement as reached may not be permanent, but displays an earnest desire on the part of the city to help the company out of the rut of its financial difficulties. Should either party to the agreement find it unsatisfactory after trial they may appeal to the State Railroad Commission for a new adjustment.

Supervisors Check Headways in Los Angeles

A revised system of supervision of car lines which includes checking of time to assure even headway and riding supervision over the lines has been introduced by the Los Angeles Railway.

Practically all lines of the system run through the downtown district and serve opposite parts of the city. Supervising points for both ends of all lines have been selected where a man can watch one end of two or three lines. Both ends of line combinations are protected from 6 a.m. to 7 p.m. This requires nineteen day supervisors. The night service is handled by eleven men, who stay on duty until 2 a.m.

The day supervisors are instructed to remain at the strategic points during the morning rush hour service and to devote their attention to keeping cars on even headway unless called away by an emergency. After 9 a.m. the supervisor is expected to use his discretion in leaving his post and riding over the parts of the lines under his jurisdiction. This gives him a chance to work with individual trainmen who need assistance and to observe infractions of rules, as well as to maintain adequate service through the midday.

The day supervisor must return to his checking point by 3:30 p.m., when the afternoon tripper service starts. The night men relieve the day men at 4 and 5 p.m. The night man then remains on the supervising point, giving his full attention to headways, until after the evening rush travel is over. The day supervisor who is thus relieved then rides his lines until he is due off at 6 or 7 p.m. This gives both riding supervision and a check of headway during the busiest part of the day.

A new type of time book has been supplied to the supervisors so that by glancing at the train run number, shown on the front of the car, and at his book a supervisor can tell immediately if the car is on time. The system is being handled with thirty men and three chief district supervisors. Every supervisor has a day off each week.

Supervisors are instructed to keep in close touch with conditions on all parts of the system through the emergency telephone board, each point of supervision being in direct telephone communication with the exchange board. A part of the instructions to supervisors reads as follows:

> Do not tell any trainman to go across and get his orders from the other supervisor. A vacillating policy leaves a bad impression of your ability with the man involved. Dispose of his case on the spot.

Two and a Half Cents for School Children

The Seattle & Rainier Valley Railway, Seattle, has filed a fare schedule with the Department of Public Works granting a fare of 2½ cents, forty tickets for $1, for school children, effective Sept. 4. This is the same rate paid on the Seattle Municipal Railway lines.

Proposal to Link Bus and Railway in New York City

The New York Transit Commission on Sept. 12 fixed Sept. 25 as the day for a public hearing upon the application of the Manhattan Bus Corporation for a certificate of convenience and necessity to insure continued bus operation over the crosstown routes at Seventy-ninth, Eighty-sixth and Ninety-sixth Streets, Manhattan. These routes are now operated under city supervision. They are among those which are at present not covered by legal permits and are threatened with stoppage by a recent decision of the Court of Appeals. The company has an application pending before the Board of Estimate for a franchise for the routes. While the Transit Commission can hold the hearing as to the certificate of convenience and necessity, it cannot issue such certificate or the complementary permission to operate until the company has a franchise.

An unusual feature of the application is that the bus company proposes, under an agreement with the New York & Harlem Railroad, which owns and operates the Fourth Avenue trolley lines and the Eighty-sixth Street crosstown trolley, to issue and accept transfers to and from the Fourth Avenue line wherever intersected by the bus lines, good anywhere between the Post Office and 135th Street. This would mean that for a single fare passengers of the Fourth and Madison Avenue line would be transported crosstown at a number of points in the Yorkville section of upper Manhattan.

Wants Extension of Six-Cent Fare Zone

Extension of the 6 cent fare to the western limits of Huntington, W. Va., so as to include Westmoreland, recently annexed to the city of Huntington, has been requested in a petition to the Public Service Commission drafted by City Attorney C. W. Strickling. Under the terms of a former order granted by the Public Service Commission the Ohio Valley Electric Railway was permitted to charge a 6-cent fare in all parts of the incorporated limits of the city. That order was issued before Westmoreland was annexed to the city, so that the company has continued to collect a second fare beyond the old western corporation line at the Four Pole Bridge. The petition of the city attorney requests the commission to construe its former order so as to include all of Westmoreland in the 6-cent zone, and if it will not admit of that construction, to order the company to extend the zone to the new western corporation limit.

A delegation from the new Tenth Ward recently requested the commissioners to take necessary steps to obtain a 6-cent fare for the entire district. Mayor Chapman informed officials of the company of the request, but W. R. Power, general manager of the company, replied in a letter that the extension would be disastrous to the Huntington-Ashland interurban line. On further requests of residents the commissioners of Huntington authorized the city solicitor to take the case before the Public Service Commission.

Hearing Will Dispose of Fare in Spartanburg

A hearing was scheduled for Sept. 12 in Columbia on the petition of the South Carolina Gas & Electric Company for a 5-cent increase in fares on the railway and bus systems in Spartanburg. This is another step in the railway problem of that city, which has remained unsolved now for several months.

The city filed on Aug. 24 with the Supreme Court of South Carolina a demurrer to the returns that have been filed with that court by the railway company. It is the contention of the city that the returns shown by the company are insufficient and that the company has been amassing larger profits than at any time in its history. The city denies "the operation of the street railway would, if efficiently managed and managed without a view solely to being able to show a loss, necessarily result in a loss."

Employees Asked to Help

In carrying out further its plan for soliciting constructive criticism from its patrons and employees, President George M. Alexander of the Monongahela-West Penn Public Service Company has recently addressed a personally signed letter to the 1,300 employees of the company in which he asks for helpful suggestions. The appeal in part follows:

> You come in daily touch with things some of us probably never see; you meet people that some of us scarcely ever meet. I know you see things done, you probably do things for the company in your work, that in your opinion ought to be done differently; you see where work could be better done or more cheaply done; you see where the company could save money, where it could give better service.
>
> Now, we want your help and your suggestions. If your friends or your neighbors give you any suggestions regarding our operations, pass them on to us. Each suggestion will have the most careful attention and consideration.
>
> As a basis to work from in connection with these suggestions, suppose each day we devote five minutes to thinking of a better way of doing the job given us to do.
>
> I feel that this is a big family working together for the growth of this property, that we are all personally interested in the success of our company and its reputation with the people we serve and throughout the territory in which we operate, and real growth, real success and real good will can only be brought about by our working together.

Grants Jitney Licenses.—The City Council of Boston has voted to grant three jitney licenses to the Norfolk & Bristol Bus Company to operate buses in Hyde Park as feeders to the Boston Elevated.

Applies to Operate One-Man Cars.—The Eastern Wisconsin Electric Company has asked permission of the Wisconsin Railroad Commission to operate one-man interurban cars over its Fond du Lac-Oshkosh-Neenah division.

Wants Five-Cent Fare Extended.—The Puget Sound International Railway & Power Company, Everett, Wash., has applied to the Department of Public Works for permission to extend the 5-cent fare in Everett until Nov. 30. The 5-cent fare has been effective in Everett for nearly a year.

Considers Bus Operation.—The New Jersey & Pennsylvania Traction Company is said to be considering the advisability of abandoning its line and substituting buses. This action will be taken if the company is compelled to expend $30,000 for street pavement in Morrisville, Pa.

Freight Service to Be Reduced.—Owing to the falling off in freight traffic, the Olean, Bradford & Salamanca Railway, in Bradford, Pa., will reduce its freight service, so that freight cars will run only three days a week. This service will be maintained until a greater resumption of traffic justifies the six-day schedule now in force. This reduction in freight car service is another step in the retrenchment program of the railway, which is cutting its operating expenses to a minimum in order to allow a greater amount to be applied annually to improvements to the system.

Refuses Bus Permits.—Since the General Assembly last spring placed motor buses under the Virginia Corporation Commission that body has consistently refused to grant a permit to operate bus lines in direct competition with intercity electric railway transportation and in its action has had the backing of the municipalities of Virginia affected by such decision. Several requests for permits to operate between Virginia cities in competition with established electric lines have been rejected by the Corporation Commission. In explaining the action of the commission, Major Alexander Forward stated that the commission is not committed to this policy but that circumstances have so far not justified issuance of permits for such competition.

Will Start Bus Service.—The Northern Texas Traction Company, Fort Worth, Tex., has announced that it will start a bus service to Riverside, an addition to the city of Fort Worth that is now without railway service, and will remain without service until the extension of the traction company's line into that section can be built. George H. Clifford, vice-president and general manager of the traction company, said the company would place several buses in service on the regular jitney lines into Riverside and would charge a 7-cent fare with privilege of transfer to the railway at the present terminus of the line. The traction company decided to place the motor buses in service when the City Commission passed an ordinance stopping the operation of jitneys into Riverside. The jitneys had been operating for some time and had been charging a 10-cent fare.

Personal Items

Mr. McCants, Manager

New Operating Executive at San Francisco Entered Service There in 1906

Melnotte McCants, whose appointment as general manager of the Market Street Railway, San Francisco, was referred to in the Sept. 1 issue of the ELECTRIC RAILWAY JOURNAL, is a native of Spartanburg, S. C. He entered the employment of the leading railroad of that district—the Southern—as a clerk. In addition to mastering his regular duties, he took up the study of stenography at night school; and it was his proficiency in this line that brought him to the United Railroads, the predecessor of the Market Street Railway, in 1906 as stenographer in the president's office.

Melnotte McCants

In 1910 he was appointed chief clerk to the general manager. In March, 1918, he became assistant to the general manager. In August, 1919, he was promoted to assistant general manager. And now comes his elevation of a few weeks ago.

He has been very active in affairs of the American Electric Railway Association and his services have been sought by the various committees of the association such as the committee on education, the committee on merchandising transportation, etc.

As a citizen, his help has been of great value in numerous community projects and he is in constant demand in this regard. He is a prominent member of the Rotary Club. Among the rank and file of the company at San Francisco Mr. McCants has established himself as a broad-minded official, absolutely impartial in his decisions. His appointment to the post of general manager affords a striking illustration that preachment and practice are synonymous in meaning on the Market Street Railway, for employees entering the service of the company are reminded at the inception of the term of their employment that "the highest position in the gift of the company is open to the qualified employee."

H. L. Doherty Elected to American Light & Traction Board

Henry L. Doherty, president of the Cities Service Company, the Doherty Operating Company and other corporations, has been elected a director and member of the executive committee of the American Light & Traction Company, New York, owning all the common stock of seventeen public utilities in various parts of the United States, most of them gas light companies.

Changes in Citizens Traction Company

The following changes have been made in the personnel of the Citizens Traction Company, Oil City, Pa.: John E. Zimmerman is now president, replacing Joseph Seep. Mr. Zimmerman was formerly secretary, and in that capacity has been succeeded by C. A. McClure. V. A. Redfield, who was general superintendent, is now general manager.

Mr. Cummings Made Assistant to Chairman

Fred A. Cummings, since 1919 public relations representative of the Eastern Massachusetts Street Railway, Boston, Mass., has been appointed to the position of assistant to the chairman of the public trustees. He was formerly a special writer on the Boston *Globe* and before that was a member of the staff of the Lynn *Item*. As recently as last July the Boston *Herald* paid Mr. Cummings a backhanded compliment by saying that "when the new era of street railway management arrived on the Eastern Massachusetts Street Railway under public control five years ago the men selected to rehabilitate the property looked around for a man who had spent his years finding fault with the system and they naturally turned to Cummings."

Fred Cummings knew the state of the public mind then and he knows it now. His work as the representative of the company on the board of arbitration which recently heard the complaint of the men for more money is just one instance that shows this. Mr. Cummings has the courage of his convictions. It was this quality that made him successful as a newspaper man and it is this quality that has made for his success with the railway. The intuitive writer in the *Herald* before mentioned said of Mr. Cummings in respect to this quality in him:

"By experience he knows when a complaint is justified, and if he advises the trustees to change their methods they generally follow his advice. He also knows, however, when the road is in the right, and he does not hesitate to jump on the local politician who seeks to excuse his own shortcomings by telling the people the Eastern Massachusetts is responsible for all civic ills."

In short, Fred Cummings knows when and how to be militant. His newspaper training has taught him discrimination.

Mr. Pettengill to Manage Ohio Interurban

I. W. Pettengill, electrical engineer, formerly with the Cincinnati Screw Company, Loveland, Ohio, has become secretary and general manager of the Cincinnati, Milford & Blanchester Traction Company. J. P. Peurrung will continue as president of the interurban company, but Mr. Pettengill will be in active charge of operations. Mr. Pettengill was graduated from Brown University. He was at one time connected with the Western Electric Company. The Cincinnati, Milford & Blanchester Company, better known as the "Kroger Line," was one of the first traction companies, if not the first, in the United States to operate one-man cars in interurban service. The company operates 37 miles of line and serves Woodland and Kroger Hills Parks.

I. W. Pettengill

H. W. Kidwell Joins National Railway Appliance Company

H. W. Kidwell has resigned as electrical engineer of the Washington & Old Dominion Railway, an interurban line running from Washington to Bluemont, Va., effective Oct. 1, to become Southern representative of the National Railway Appliance Company, New York. His headquarters will be in Washington. Mr. Kidwell entered the employ of the Washington & Old Dominion more than eleven years ago as electrical foreman. Subsequently he as advanced to assistant electrical engineer and then to chief electrical engineer, with supervision of overhead lines, track bonding, power and equipment.

New Engineering Firm

The Buchanan & Layng Corporation has been organized to specialize on traffic surveys for electric railways, schedules, and all phases of equipment maintenance. It has opened offices at 49 Wall Street, New York.

C. B. Buchanan, the president, was for many years vice-president and general manager in charge of operation of the Virginia Railway & Power Company, which serves Richmond, Norfolk and Petersburg with light, power and electric railway service. He was a pioneer operator of the trackless trolley and directed its early development. Mr. Buchanan entered the electric railway field as treasurer and auditor of the Memphis & Raleigh Springs Railroad, Memphis, Tenn., in 1891. When this property was merged with others in Memphis two years later, he resigned to construct and operate railways and lighting plants in Mississippi, later managing the railway and lighting plants at Meridian, Miss. He joined the Richmond Passenger & Power Company and Richmond & Petersburg Electric Railway Company, predecessors of the Virginia Railway & Power Company, in 1901, subsequently being promoted to the position of general manager, to which he was appointed in July, 1911. He resigned from this position on Sept. 27, 1921, to engage in consulting business.

J. F. Layng, the vice-president, has for the past several years devoted his time to consultation work, being engaged principally by large operating systems. His electric railway experience began in 1889 when he went with the Federal Street & Pleasant Valley Street Railway of Allegheny, Pa. Soon thereafter he entered the service of the Pittsburgh & Birmingham Traction Company in its shops, working on car equipment. In 1891 he went with the Westinghouse Electric & Manufacturing Company, taking the apprenticeship course and working in practically all departments.

He remained with the Westinghouse company until 1910, when he was appointed engineer with the Maryland Electric Railway at Annapolis, resigning from this position in 1912 to become engineer in the railway and traction engineering department of the General Electric Company.

During the war Mr. Layng directed the electric railway fuel saving campaign over the entire United States for the United States Fuel Administration at Washington. It was due to his efforts that the skip-stop system was so generally used at that time.

Mr. Layng is a specialist on schedules, traffic problems, equipment selection and equipment maintenance. His work has brought him into direct contact with all the large transportation systems in this country. He has also made a number of reports of steam railway electrifications.

Edwin M. Walker Goes to Schenectady

Excellent Operating and Public Relations Record of Indiana Executive Results in Call to New York State

The coming president of the Schenectady Railway is Edwin M. Walker. As general manager, since the close of 1917, of the Terre Haute division of the Terre Haute, Indanapolis & Eastern Traction Company Mr. Walker became a national figure in the industry. Good work in the management of the Union Electric Company, Dubuque, Iowa, had brought the call to Terre Haute, but it was in the great mining center of Indiana that Mr. Walker got the first big opportunity to show his mettle.

The automobile, the jitney and the increased unit fare were playing havoc with electric railways in practically every medium-sized city of the country when Mr. Walker went to Terre Haute. To a man of common mold nothing would have been easier than to seek through council action stricter parking regulations, jitney suppression and higher fares, but Mr. Walker preferred better and shorter roads to the two-fold objective of pleased customers and pleased stockholders. His bold way of using the safety car is one of the most encouraging chapters in transport history. No car-for-car substitution for him, but a 60 per cent increase in service. Nor was there any exchange of new cars for the promise of a higher fare. He took the chance that increased revenue would come from more rides at the good old nickel, and won so handily that the money for the second lot of safeties came from local capital. Almost anybody would be satisfied to stop at a 5-cent fare, but not Walker. In May, 1922, he added the weekly pass so that his wholesale customers could enjoy an average fare of 3⅓ cents. Still customers and revenue increased. A study of Terre Haute figures shows that car riding has jumped from 120 rides per inhabitant in 1918 to 258 in 1923. The graph hound will find the full story in the ELECTRIC RAILWAY JOURNAL for Aug. 25, 1923. Jitneys have been very nearly crowded out of the picture by the sheer force of economic laws. Latterly, Mr. Walker has also made things hot for interurban jitneys through the sale of 100-mile strips at pre-war prices.

E. M. Walker

A Briton born (Worksop, 1875) and a graduate of fine old Williams, Edwin M. Walker takes the broad cultural and humanitarian interest in affairs that must be a large factor in the success of a public utility executive. Those who know him best have reason to expect that he will gather fresh and bigger laurels in his new work. His election as president of the Schenectady Railway took place at a recent meeting of the board of directors, and is effective Oct. 1, 1923.

R. J. Seigfried is superintendent of the Bethlehem Transit Company. In this capacity he replaces W. H. Garner.

John Faulkner has succeeded W. B. French as treasurer of the Turner Railroad, Turner, Me.

Hugh Scott has succeeded H. N. Beckett as secretary and treasurer of the Cumberland & Westernport Electric Railway, Baltimore, Md.

Arthur L. Davis, formerly electrical engineer of the Bangor Railway & Electric Company, is now chief engineer, replacing Phifer Smith.

Henry G. Bradlee is now president of the Paducah Electric Company and Norman W. Mumford has been added as vice-president. L. Vernis Smith is assistant treasurer.

Tom P. Walker has succeeded P. I. Robinson as local manager of the Baton Rouge Electric Company. Edward Godchaux and Norman M. Mumford have replaced Samuel W. Weis and Donald C. Jewett as vice-presidents.

W. E. Wood, vice-president and general manager of the Houston Electric Company, has been appointed chairman of the fourth district Texas Public Service Information Bureau, according to an announcement by George McQuaid, in charge of the bureau, which maintains headquarters at Dallas.

Hudson R. Biery, purchasing agent for the Union Traction Company for the last four years, has tendered his resignation to become assistant to Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company. Mr. Biery will move to Indianapolis to assume his new position.

Mark T. McKee of Detroit, assistant to the president of the American Short Line Association, has been named vice-president of the Salt Lake & Utah Railroad, known as the Orem electric line. In his executive capacity with the Short Line Association Mr. McKee has gained a national acquaintance among the operators of the smaller railroads of the country. Mr. McKee fills a place on the official roster of the company made vacant by the resignation of Ross Beason nearly a year ago. His headquarters will be in Salt Lake City.

Obituary

G. G. Mulhern

George G. Mulhern, one of the pioneer street railway men, died in Cleveland on Sept. 7. Mr. Mulhern was identified with the railway system of Cleveland from the time the first line was built until 1904. He became driver of a bob-tailed horse car in 1862. In the course of time the late Mark A. Hanna became interested in the railway lines in Cleveland, and recognizing Mr. Mulhern's capacity for handling men successfully, advanced him through the ranks until he became superintendent. He continued in that capacity with the Cleveland Railway under Senator Hanna as president for a number of years and following the consolidation of the Cleveland City Railway and the Cleveland Electric Railway he was appointed general superintendent of the consolidated system. George Mulhern was always a bit brusque in his manner, but he was easy to approach and had the capacity for dealing out discipline in a manner that left not the slightest trace of resentment in its wake. He was elected sheriff of Cuyahoga County and served one term commencing in 1910. From 1912 to 1916 he was adviser to Peter Witt, then street railway commissioner at Cleveland. Since 1916 he had been in the contracting business, a considerable part of his work being done for the Cleveland Railway in connection with paving carried out by that company. Mr. Mulhern was born in Cornwall, Canada, on Feb. 7, 1843. He is survived by his wife and one daughter.

J. L. Hale, for ten years chief dispatcher of the Winona Interurban Railway, Warsaw, Ind., lost his life on Sept. 4 in Big Chapman Lake while trying to save two of his companions.

Mitchell B. Perkins of Beverly, N. J., former state Senator and one time superintendent of the old Riverside Traction Company, which was later taken over by the Public Service Railway, died on Aug. 27. He was one of the organizers of the Camden & Trenton Traction Company and the Riverside Traction Company, running between Trenton and Camden.

Langdon Gibson, noted explorer, died Sept. 5 at Criehaven, Me. He was a native of Boston and was fifty-eight years of age. Mr. Gibson, up to two years ago, was production manager of the General Electric Company, Schenectady Works. He had been associated with that concern for thirty-one years and was well-known throughout the industrial world. He was a man of great activity and vigor, being one of the few members of the Stanton expedition successfully completing the expedition through the Grand Canyon of the Colorado River in 1889. He gained added fame through his accompanying Admiral Peary's second northern expedition to explore the northern coast of Greenland.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Copper at 13 Cents

The market for copper is again in the doldrums. The price is slightly more than 13 cents, a figure at which production of the raw metal is unprofitable to the mining companies. Last spring, with the reduction in the amount of the accumulated supply of the yellow metal then on hand, the price began to soar and on March 15 the quotation was 17 to 17¼ cents. The prospects then were that the price would probably go much higher. Purchases were stimulated as the selling figure began to climb, but authorities writing upon the outlook for the market for the metal marshalled strong arguments at that time to indicate a probable continued advance in prices. As a matter of fact, there was no mistaking the tendency of the price movement at that time, but the producers appear not to have judged accurately the extent of the buying movement as regards the extent of the prospective consumption.

About two years ago the stock of copper in the United States was estimated at 1,000,000,000 lb., but by the first of this year it has been greatly reduced. The tendency of the price to climb early in the spring stimulated the buying movement and became at one time so pronounced that production was in turn stimulated again and by early summer there was a return to the condition of overproduction. At present production is estimated to be at the rate of 2,200,000,000 lb. a year. This compares with a pre-war average of less than 1,500,000,000 lb. Thus the present is distinctly a buyer's market.

For the producer the prospects immediately ahead are none too bright, but the economic tendency of the industry is toward stability through the medium of larger economic units combining producer and consumer as in the case of the Anaconda-American Brass affiliation and the Lake Superior-Calumet & Hecla consolidation. Consumers may profit temporarily as regards price by conditions such as exist at present in the copper and the oil industries, but in the end the market gradually works itself around to a level that affords the producer a profit.

Hungary Making Electric Railway Equipment

Orders for sixty electric railway cars for the city of Amsterdam, Netherlands, are reported to have been received by the Ganz Danubius Company, one of the largest machine factories of Hungary. This company, according to the United States Commerce Report of Sept. 3, is at present engaged also in the work of repairing railway cars which belong to the Hungarian State Railway, but which have been awarded to Jugoslavia by the peace treaty. Extensive orders are said also to have been received by the company from Rumania, Poland and Italy.

Pull-offs Available

The Department of Street Railways of the City of Detroit recently placed an order for 5,000 single-curve pull-offs and an equal number of double-curve pull-offs, both of drop-forged steel and made by the Drew Electric & Manufacturing Company. In making quotations it appeared that 10,000 double-curve forms would have cost only $70 per hundred, as against $77.75 per hundred for 5,000 double-curve pull-offs. A similar reduction from $46.10 per hundred where only 5,000 were on order to $40 per hundred if 10,000 had been ordered would be possible with the single-curve pull-offs.

There is, therefore, an unusual opportunity for any one wishing to secure low price on drop-forged pull-offs to get them at this time. A full description of this device is given on page 411, this issue. It is believed that the dies are good for at least 10,000 pieces. This is a good example of a case where the pooling of orders for die-requiring materials would be a great help.

Moreover, the drop-forged pull-offs are much cheaper than those made of malleable iron. H. M. Gould, electrical engineer for the Department of Street Railways, estimates that the latter would cost about $101.50 per hundred for double-curve pull-offs and $63 per hundred for the single-curve pull-offs. A saving of from $15 to $30 per hundred is, therefore, effected by the use of the drop-forged article.

Metal, Coal and Material Prices

Metals—New York	Sept. 11, 1923
Copper, electrolytic, cents per lb.	13.75
Copper wire base, cents per lb.	16.125
Lead, cents per lb.	6.80
Zinc, cents per lb	6.52
Tin, Straits, cents per lb.	42.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	$5.075
Somerset mine run, Boston, net tons.	2.50
Pittsburgh mine run, Pittsburgh, net tons.	2.30
Franklin, Ill., screenings, Chicago, net tons	1.75
Central, Ill., screenings, Chicago, net tons	1.325
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.00
Weatherproof wire base, N. Y., cents per lb.	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.375
Turpentine, (bbl. lots), N.Y., per gal.	$0.99

Rolling Stock

Intercity Terminal Railway, North Little Rock, Ark., has purchased six sixteen-passenger buses.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has purchased twenty-five safety cars from the F. B. Cutter Company, 50 Church Street, New York. Ten will be placed in Terre Haute and fifteen in Richmond, Ind.

Virginia Railway & Power Company, Richmond, Va., has just received twenty new safety cars which were ordered from the J. G. Brill Company on June 15. The specifications of these cars follow:

Type of car	Birney
Seating capacity	32
Total weight	16,500 lb.
Length over all	28 ft. ½ in.
Truck wheelbase	8 ft. 0 in.
Width over all	7 ft. 8 in.
Height, rail to trolley base	10 ft. 8 in.
Body	Steel
Interior trim	Birch
Headlining	Agasote
Roof	Arch
Air brakes	G.E. C.P. 27
Armature bearings	Sleeve
Car signal system	Faraday
Car trimmings	Cherry
Conduits and junction boxes	Brill
Control	K-10
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Designation signs	Hunter
Door operating mechanism	Safety Car Equipment
Fare boxes	Johnson
Fenders or wheelguards	H. B. Life Guard
Gears and pinion	G.E.
Hand brakes	Brill
Heater equipment	Consolidated
Headlights	O. B. Company
Journal bearings	Sleeve
Journal boxes	Brill
Lightning arresters	G.E. Company
Motors, type and number	G.E. 264
Paint varnish or enamel	Enamel
Registers	International
Sanders	O. B. Company
Sash fixtures	Brill
Seats	Brill Waylo
Seating material	Slat
Slack adjuster	Brill
Springs	Brill
Trolley catchers or retrievers	O. B. Company
Trolley base	O. B. Company
Trolley wheels or shoes	Wheels
Trucks	Brills
Ventilators	Brill
Wheels (type and size)	26 in. cast iron

Special devices, etc.—Doors open inwardly: seat on one side, longitudinal, grab handle on front corner post.

Track and Roadway

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., will raise its tracks on Racine Street in Neenah between Broad and Third Streets.

Des Moines City Railway has started the Crocker Street extension. It is expected that this 2¼ mile line, which will cost more than $160,000, will be completed by the first of the year. The line will be double tracked a good portion of the way.

Portland Railway, Light & Power Company, Portland, Ore., is completing the work of reconstructing car tracks on Holladay Avenue from Union to Larrabee Street, at a cost of $15,000. The work includes repaving and laying new rails.

Baton Rouge Electric Company has now pending before the Commission Council application for a franchise which will give a car service to the Standard Oil Refinery plant and to the suburban town of Istrouma and other sections not now served by an electric railway. The contemplated extensions are estimated to cost $80,000.

Northern Texas Traction Company, Fort Worth, Tex., announces that it is planning to double track the entire line between Dallas and Fort Worth. Work will be started in the near future on a 9-mile stretch, according to V. W. Berry, general superintendent. When this stretch is double-tracked there will remain only a few miles of single track, Mr. Berry said, as about one-half of the line is now double tracked. Completion of this program will enable the company to increase the number of cars in operation on the line and to speed up service.

Professional Notes

Hammer & Schwarz, consulting engineers, have changed their business address to 55 John Street, New York City.

George B. Nichols, consulting engineer, 300 Madison Avenue, New York City, and the **Terrell Croft Engineering Company,** of which Terrell Croft is directing engineer, of 6600 Delmar Boulevard, University City, St. Louis, have effected an affiliation whereby the experience and resources of each organization will be available to the clients of the other. Mr. Nichols will act as the principal for projects east of Illinois, whereas the Croft organization will so act for projects west of that state. The combination will specialize in mechanical and electrical engineering for power and industrial plants, institutions and buildings, as have the component companies in the past.

H. P. Hevenor, consulting engineer, formerly connected with Dwight P. Robinson & Company, Inc., has recently opened personal offices at Suite 601, 110 East Forty-second Street, New York City. Mr. Hevenor was educated in Philadelphia and has had eighteen years' experience in the design and construction of track. He started with William Wharton, Jr. & Company, manufacturers of special trackwork, and later was employed by the Brooklyn Rapid Transit Company, as track specialist and assistant engineer. He then went to Chicago with the Buda Company, in charge of the manufacture of special trackwork, and later spent five years in the office of the chief engineer of the New York, New Haven & Hartford Railroad. In 1916 Mr. Hevenor entered private practice, under the firm name of Engel & Hevenor, engineers and contractors, making a specialty of track construction, during which time he installed all the track on the Seventh Avenue branch of the New York subway. He has also built track for a number of other properties, including the Third Avenue Railway, New York City; the Eighth & Ninth Avenue Railroad, New York City; the Trenton & Mercer County Traction Company, the Capital Traction Company, Washington, D. C.; Newport News & Hampton Railway, Gas & Electric Company, Delaware, Lackawanna & Western Railroad, New York, New Haven & Hartford Railroad and the Connecticut Company, and for the past year has been retained by Dwight P. Robinson & Company, Inc., in a consulting capacity.

Trade Notes

National Railway Appliance Company of New York, N. Y., has been appointed the New York, New Jersey and New England agent of the Yellow Coach Manufacturing Company of Chicago for the distribution of city and intercity buses.

Consolidated Car Heating Company, Albany, N. Y., has announced the acquisition of the patents, equipment, good will and other assets of the Automatic Ventilator Company of New York City and also that it is prepared to fill orders for all types of automatic ventilators heretofore supplied by that company.

New Advertising Literature

Heine Boiler Company, St. Louis has issued a pamphlet drawing attention to the necessity for keeping boiler tubes clean.

Johns-Pratt Company, Hartford, Conn., has issued a folder stressing the importance of safety as the primary responsibility of the central station.

Uehling Instrument Company, Paterson, N. J., has just issued a leaflet showing in diagrammatic form the simplicity in operation of its CO_2 recorder and indicator.

Crescent Truck Company, Lebanon, Pa., has issued a descriptive and illustrated booklet entitled "Electric Industrial Trucks and Tractors." Various types of storage battery trucks suitable for use in the railway shop or warehouse are described.

Edward G. Herbert, Ltd., Manchester, England, has issued a circular describing the pendulum hardness tester, a description of which was given in the ELECTRIC RAILWAY JOURNAL for May 26, 1923, page 896. Reprints have also been made of an article on some recent developments in hardness testing which appeared in the *London Engineer* for June 29, 1923.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a new catalog covering line material and porcelain insulators. The catalog is supplementary to the company's large supply catalog and has been issued for the convenience of purchasers of these two allied lines of materials. It is a 200-page publication of convenient size, is fully illustrated and contains a complete description of all the company's line material and porcelain insulators.

PEACOCK URGES

Try the Life-Boats!

Consider the Sailor's Ways

Maritime rulings very wisely require frequent drills on shipboard. At specified intervals, though the sea may be calm and the sky all clear, the call is given to man the life-boats. Then every jack-tar learns to hop to his station, tackles are tested and gear is over-hauled. Why? To be sure that "Jack" will know his job, and to ensure that blocks won't jam when a real emergency comes.

Would Your Motorman "Abandon Ship"?

How about your own case on dry land? Does Motorman "Jack" know what to do if his air-brake fails? Will he shift to his hand-brake with the quick precision of a well-trained blue-jacket? Or will he "abandon ship" by jumping panic-stricken over-side?

And if he does try to use his hand-brake—will it work? There's the rub!

Why not make a standard practice of one hand-brake stop on every trip, at some specified point? Then you will be sure that your men are trained and familiar with the equipment. And you will soon find out whether the hand-brake equipment will work satisfactorily or not. Your motormen will tell you in plain unvarnished words of one syllable, what they think of it.

If hand brakes are unsatisfactory, let's figure on Peacock equipment. The first cost is not great, and the results in safety and economy of maintenance will pay generous returns on the investment.

The Peacock Staffless

National Brake Company, Inc.

890 Ellicott Sq. Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Business Established 1894
115 BROADWAY, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

STONE & WEBSTER
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EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
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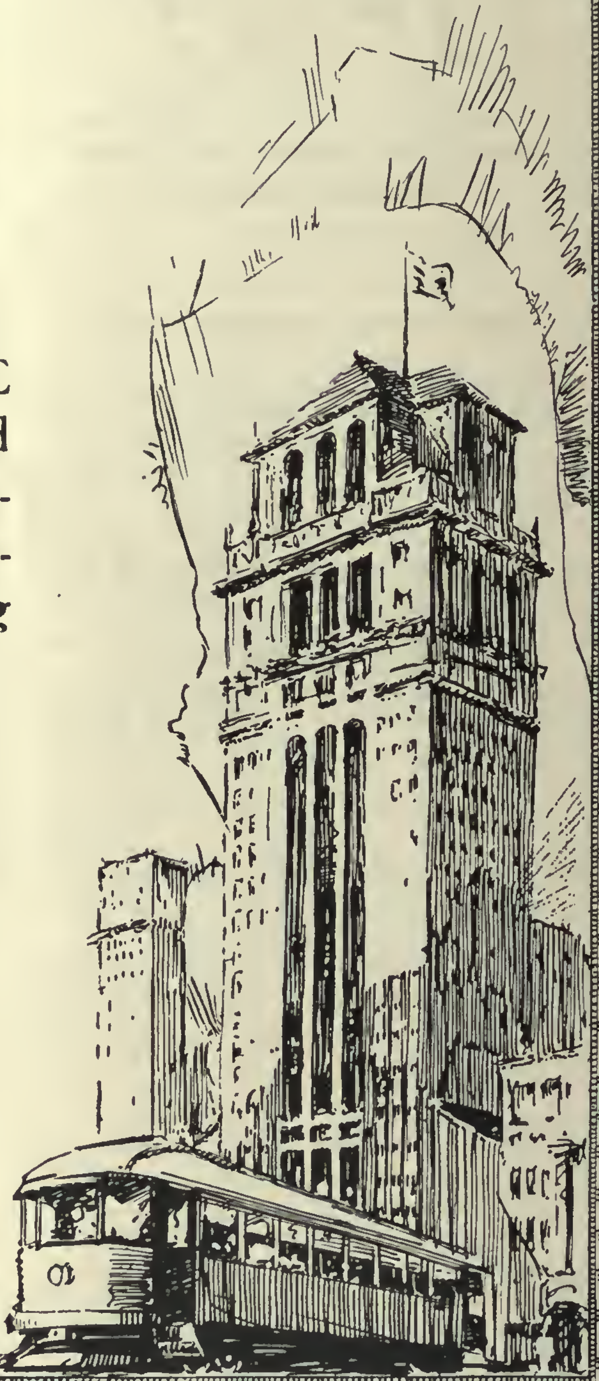

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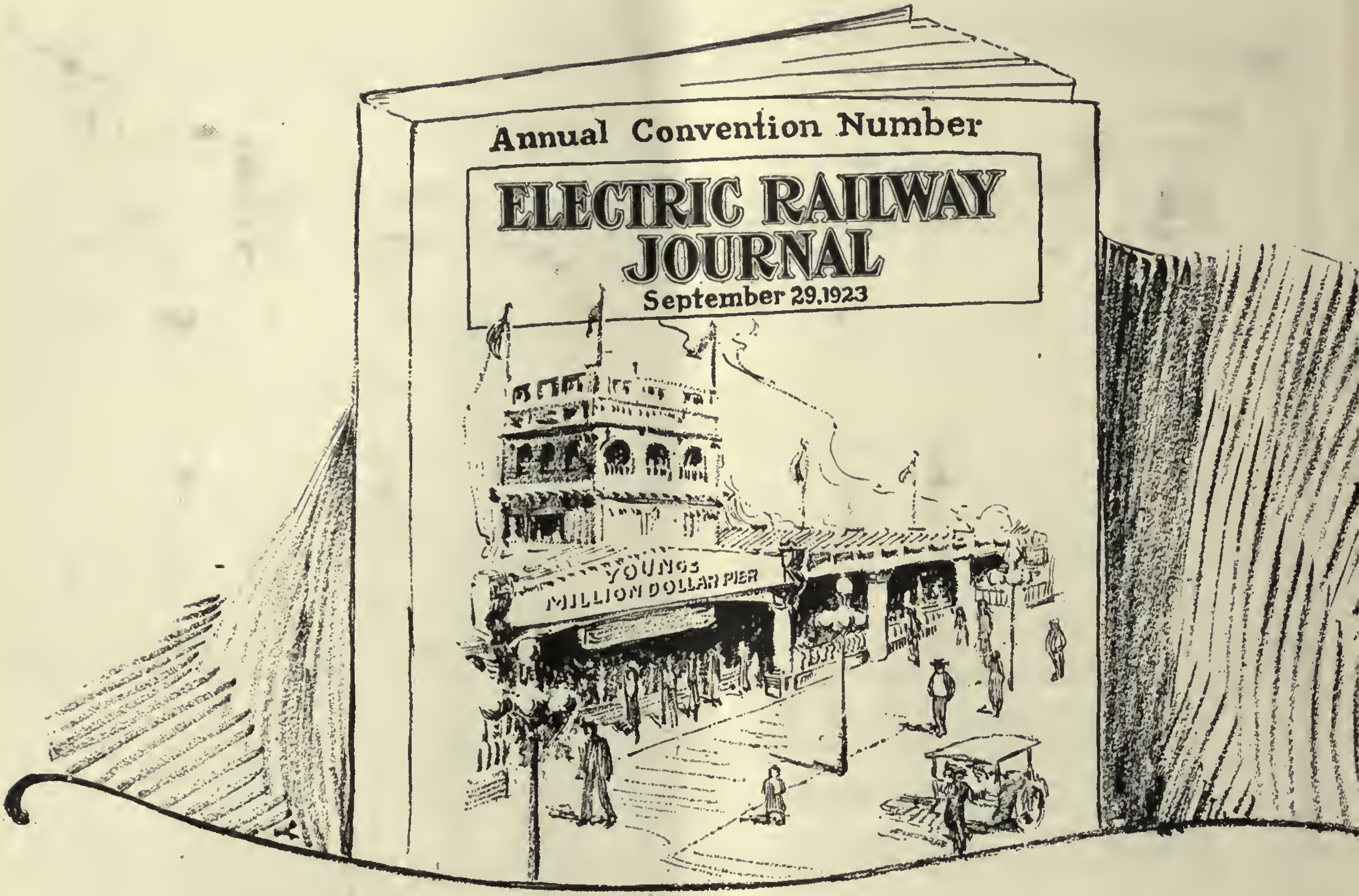

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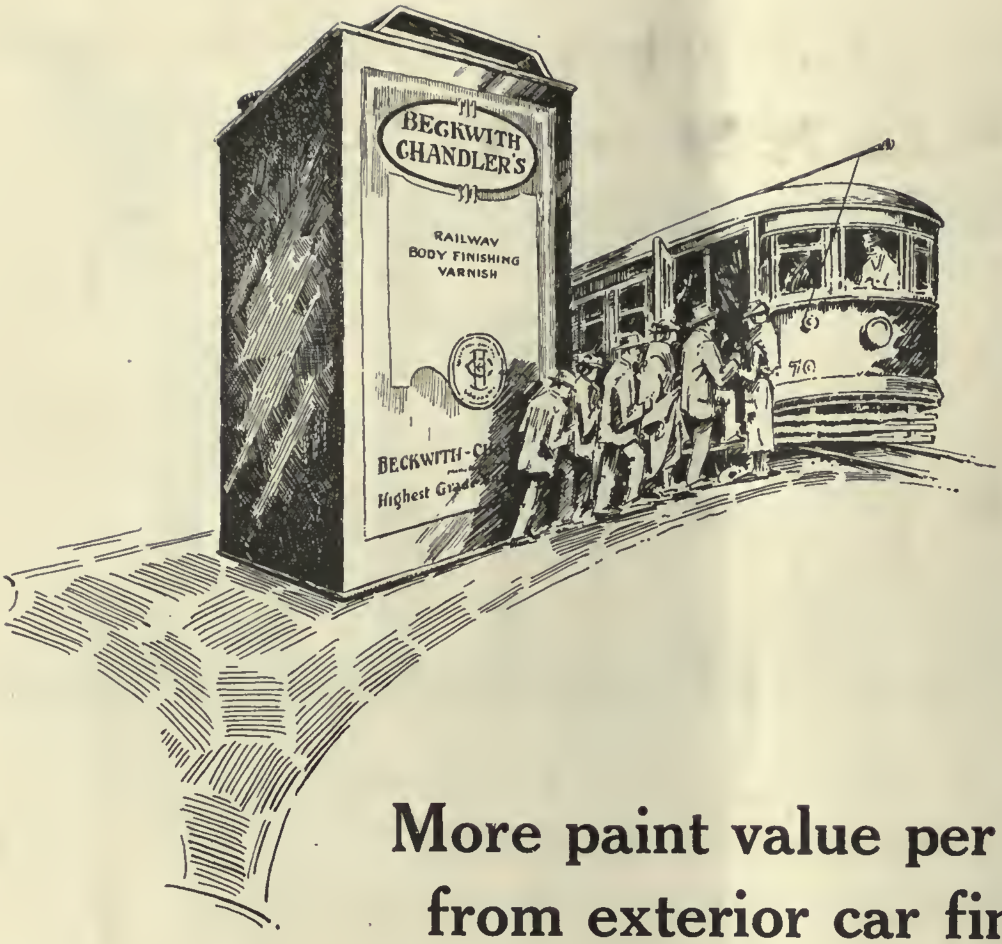

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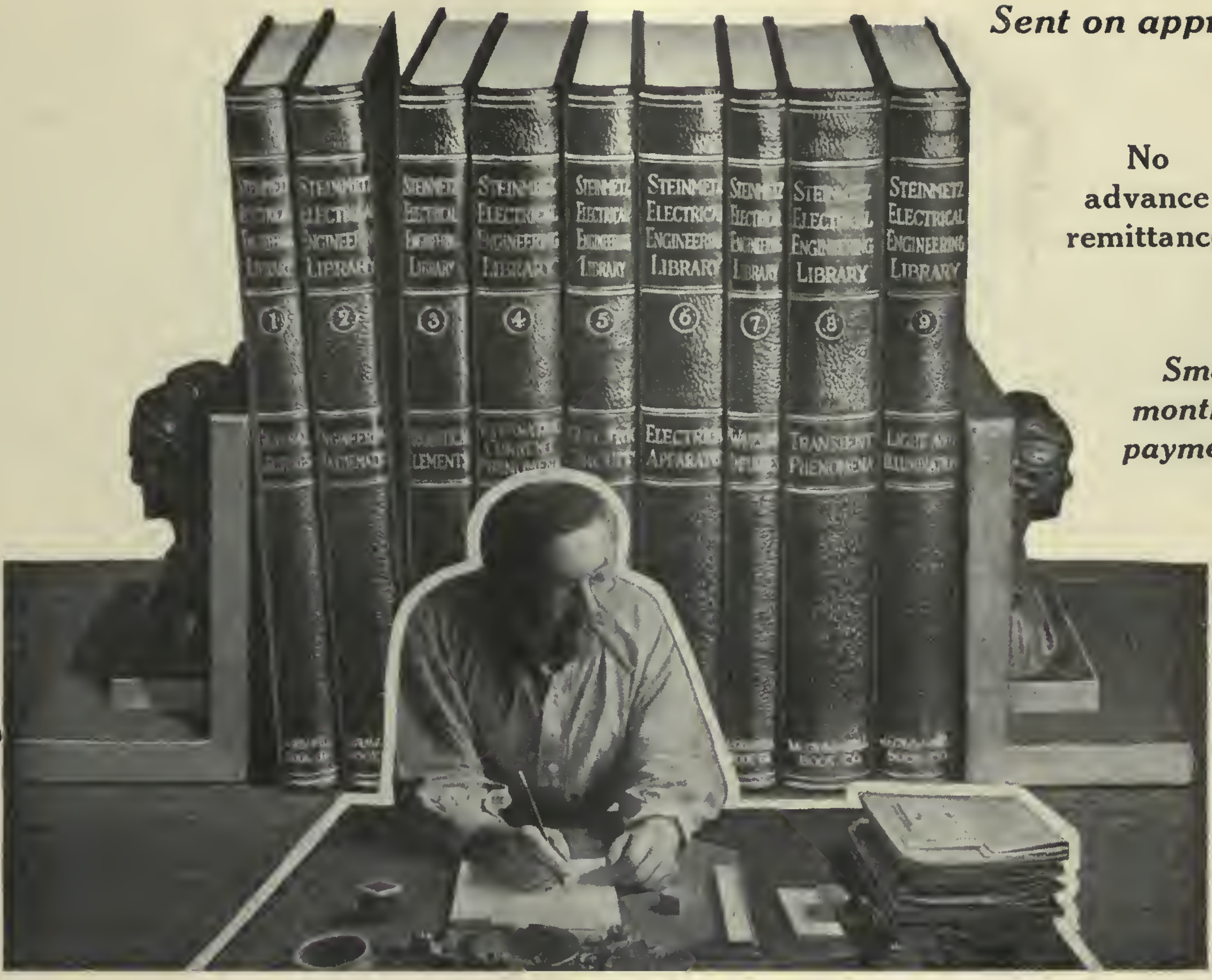

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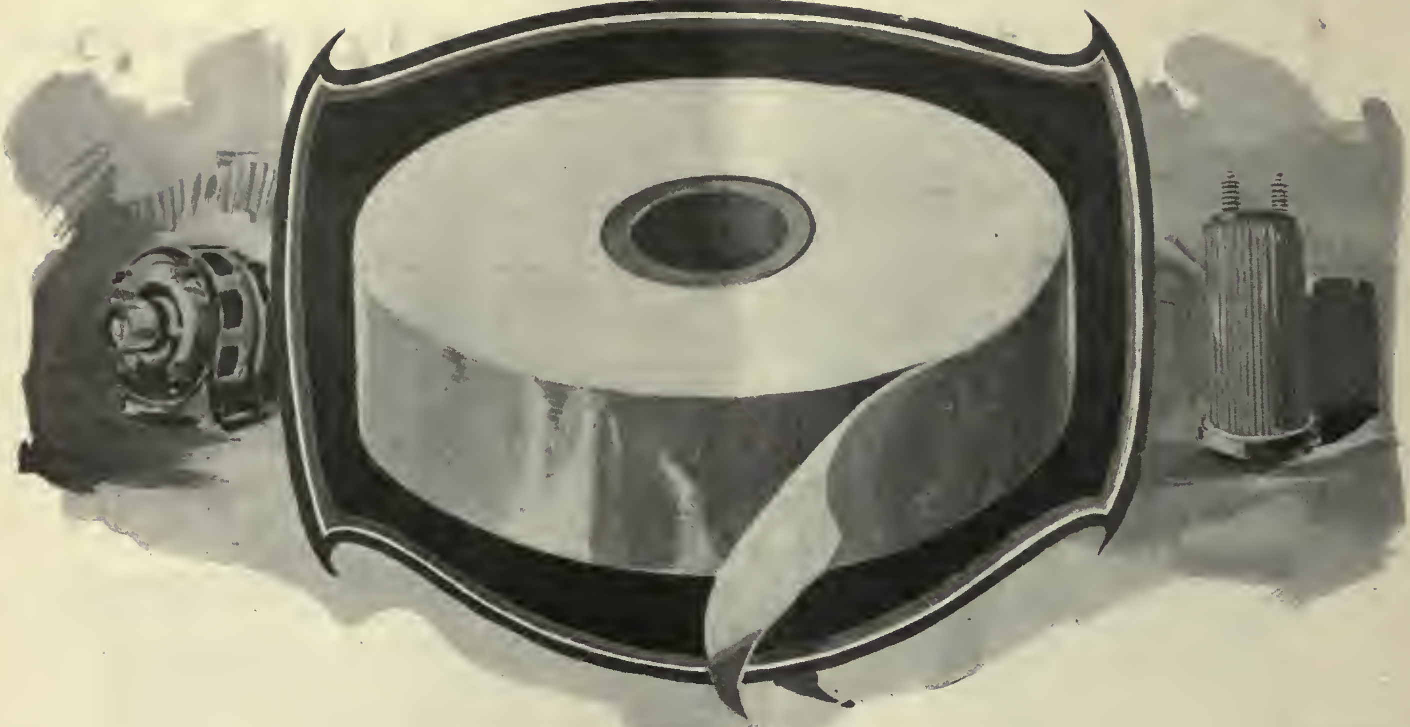

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Committee Report

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Miller Trolley Shoes, the widely-used, well-known, well-recommended device which meets all the requirements for increased contact efficiency.

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MILLER TROLLEY SHOES

Car of Tokyo Railway at
Entrance Gate to Zojoji, Tokyo

Baldwin "Locomotive-Built" Electric Motor Trucks

on the cars of the

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The above illustration shows one of the cars of the Tokyo Municipal Railway at the Entrance Gate to Zojoji Temple, Tokyo, Japan. These cars are equipped with Baldwin Type "L" motor trucks. The lower illustration shows the frame work of one of the trucks.

For this railway we built 120 trucks, each with fifty-inch wheel base. Half of that number have a center pin load capacity of 22,000 pounds, and the balance a capacity of 18,000 pounds.

The Baldwin Type "L" motor truck is the "two-motor equipment" truck for general city service, and it is characterized by simplicity, economy in operation and low cost of maintenance. Commercial shapes are largely used in construction, so repairs may be easily made.

All electric railways should have our detailed catalog describing Baldwin Motor Trucks.

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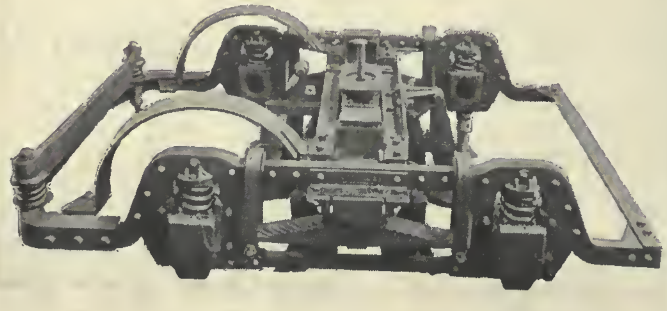

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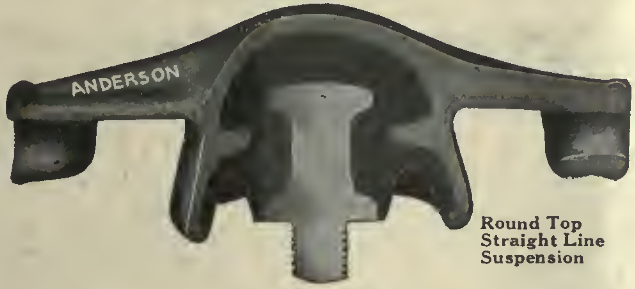
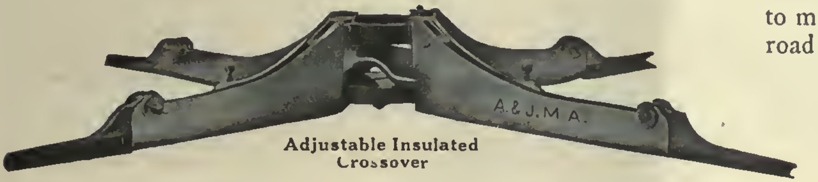


Round Top Straight Line Suspension



Adjustable Insulated Crossover

For over twenty years, Anderson Line Material has been a leader in the field because of its eminently satisfactory and long service. Aetna Insulation has helped to make this reputation for it.

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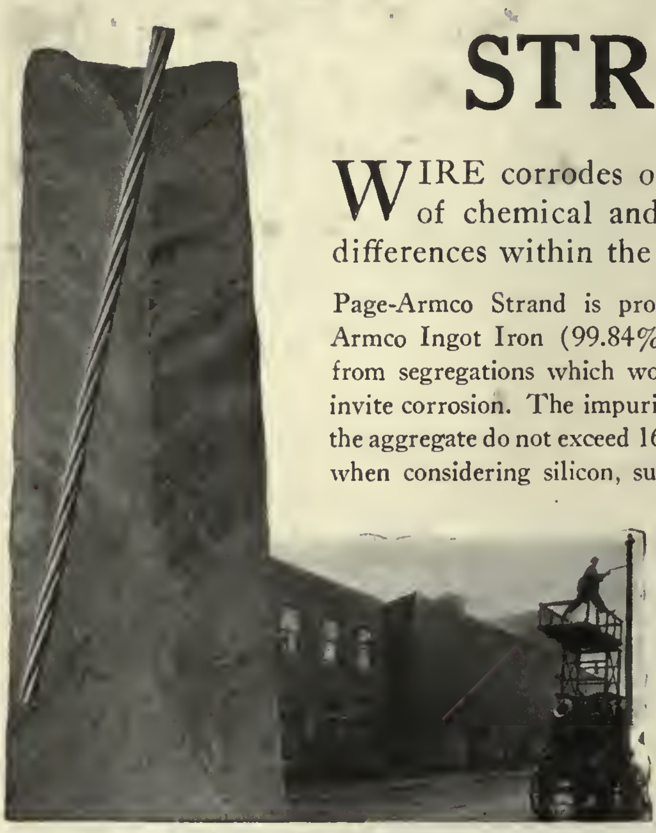

WIRE corrodes on account of chemical and physical differences within the metal.

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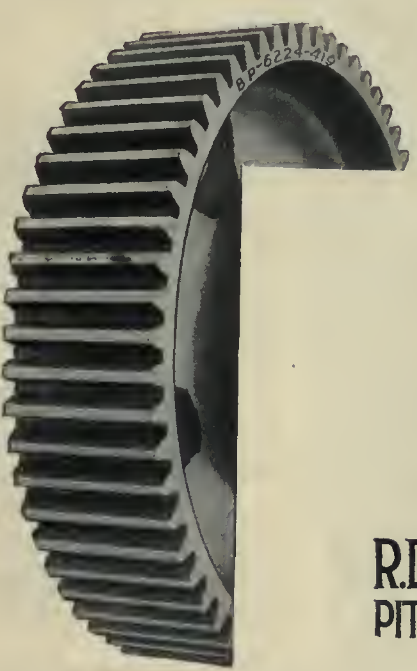

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The unshakable grip of Fahnestock Connectors gives perfect electrical contact which will not jar loose or work out. Quick - disconnecting features, without the use of tools, permits rapid removal when necessary.

Avoid annoyances which arise from defective and faulty push button construction. Equip your cars with Fahnestocks.

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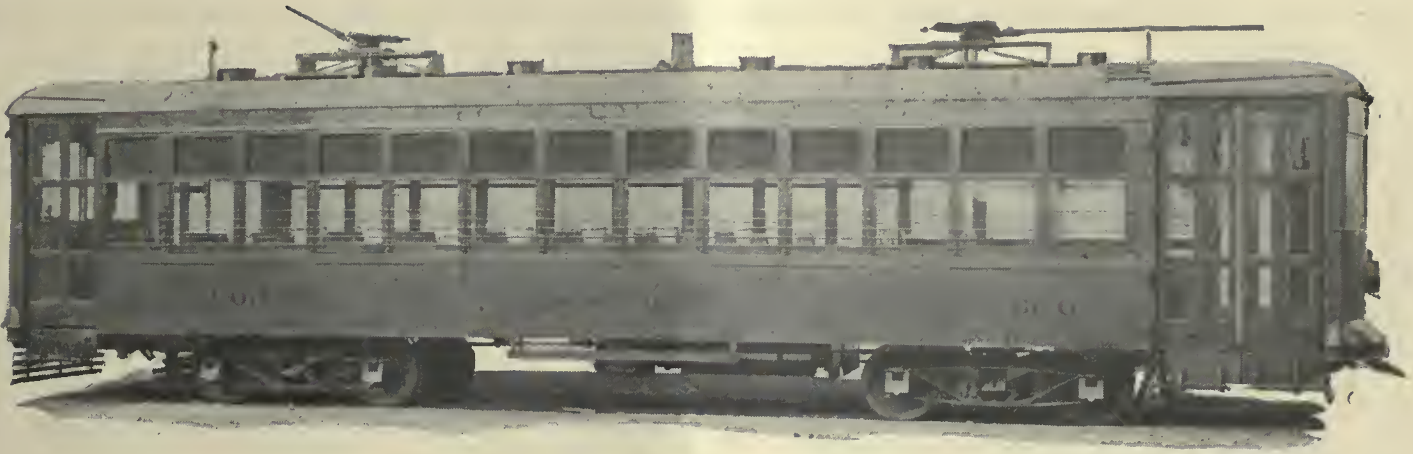

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Here is a car for operating economy and maintenance economy. Its standardized construction means lower costs.

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St. Louis Car Co. Am. 64 Type with chrome nickel steel heat-treated arch bars. Wheelbase 5 ft. 4 in.; wheels 26 in. diam.: journals 3¼ in. x 6 in.

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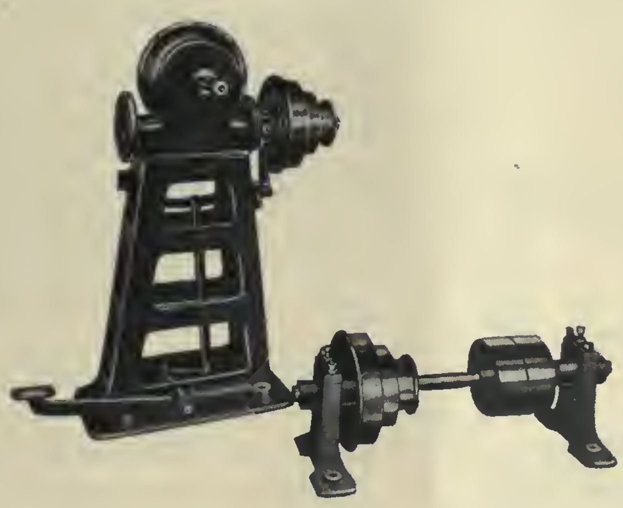
"The Birthplace of the Safety Car"



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This compact, three-speed machine occupies only four feet of floor space

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for single track block signal protection
United States Electric Signal Co.
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Peirce Forged Steel Pins
For Railway Feeders
The strongest pins obtainable in spite of their low cost.
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JOHN A. ROEBLING'S SONS CO., TRENTON, NEW JERSEY

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Lapp Insulator Co., Inc. Le Roy, N.Y.
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Great Adhesive Strength
High Quality
Long Life
Price Right

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Incorporated 1884
Sales Offices: New York—Atlanta—San Francisco
Agents: Central Electric Co., Chicago, Ill.; Pettingell-Andrews Co., Boston, Mass.; The F. D. Lawrence Electric Co., Cincinnati, Ohio; Novelty Electric Co., Philadelphia, Pa.
OKONITE
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AUTOMATIC SIGNALS
Highway Crossing Bells
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Shaw Lightning Arresters
Standard in the Electric Industries for 35 years
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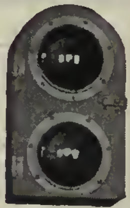

Standard Underground Cable Co.
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Manufacturers of
Copper, Brass, Bronze Wires, Rods, Tubes
Copper Clad Steel Wire
Insulated Wire of all kinds
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Cable Terminals, Junction Boxes, etc.
Boston, Washington, Philadelphia, Pittsburgh, Seattle, Chicago, New York, Atlanta, San Francisco, Detroit, Los Angeles, St. Louis

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
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Cross Ties Bridge Timbers
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Treated and Untreated

We solicit your inquiries

Creosoting Plant located
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On—Penna. R.R., B. & O. R.R., D. T. & I. R.R.
Operating Mills in Southern Ohio

Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000. Wet 31,400. Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.
Est. 1848—Inc. 1870

TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

This 3-Section

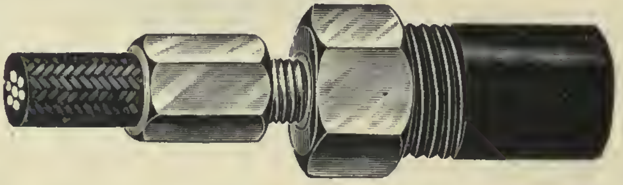
is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.

This is the way to connect ground wires to the end of a pipe



DOSSERT GROUNDING CAP
(Solderless)

Simply another way of using the Dossert Tapered Sleeve principle to simplify the work and to promote efficiency.

The fifteenth year book gives you many suggestions on good wiring methods.

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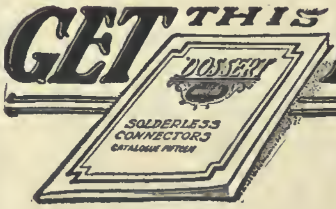

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TWIN TERMINAL
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Arc Weld and Flame Weld

Send for new
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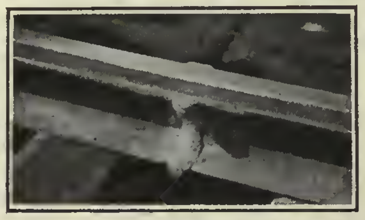
An up-to-date and most economical process for the Aluminothermic welding of rail joints. Makes the joint stronger than the rail itself.



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Special advantages — (1) Rail ends are butted together and easily aligned, no inserts needed to fill in or adjust. (2) Smaller portions of material used. (3) Grinding reduced to the minimum, only a slight touching up is needed.

The Feralite Rail Welding Process eliminates rail joints at a lower cost than any other process. Write for full details.

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Roselle Park, New Jersey

Series Type
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Rugged series resistance coil
Indestructible Mica insulation
Normal welding current at half voltage

The Electric Railway Improvement Co.
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Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
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Frogs, Crossings, Switches and Mates
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ESTIMATES PROMPTLY FURNISHED

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For Street and Steam Railways

Steel Castings Gas Cylinders
ORIGINATORS OF
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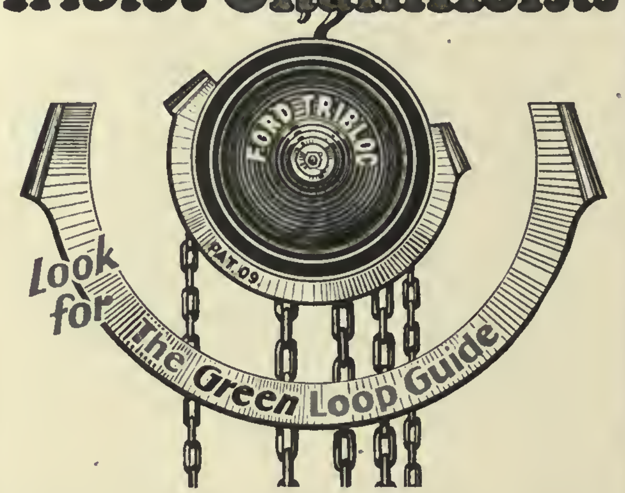
Tribloc Chain Hoists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Look for The Green Loop Guide

These hoists have 80 per cent efficiency. For example, an eighty-two pound pull on the chain of a 1-ton Tribloc will lift a ton. Made in capacities from ¼ to 20 tons.

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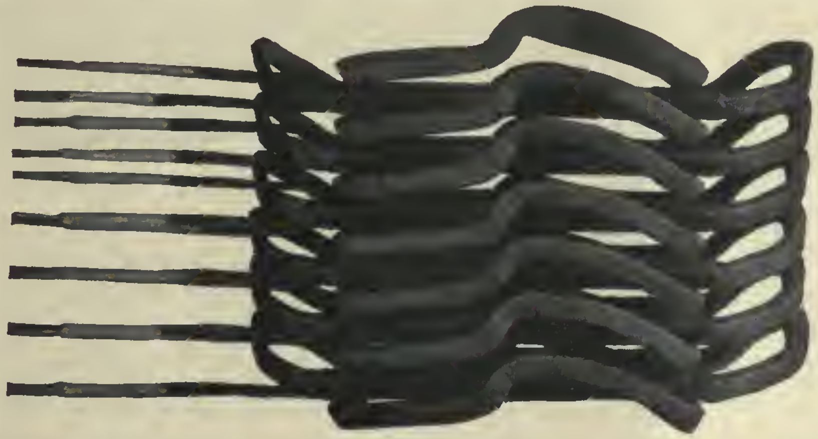

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Your replacement coils should be absolutely dependable.

More than thirty years experience in the production of armature and field coils for railway motors has qualified us to give you coils which will stand up in the most severe service. They are made in a shop specializing on this work alone. Every job receives the constant supervision of a manager who has made coils ever since the days of coil-wound armatures.

Let us quote you our prices

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RAMAPO AJAX CORPORATION

Ramapo Automatic Return Switch Stands for Passing Sidings

RACOR TRADE MARK

RACOR Tee Rail Special Work.

Manganese Construction

GENERAL OFFICES: HILLBURN, NEW YORK
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Canadian Ramapo Iron Works, Ltd., Niagara Falls, Ont.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
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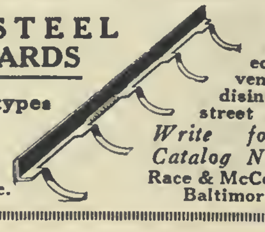
GODWIN STEEL PAVING GUARDS

Adapted to all types of rails and paving.



Proven by service to economically prevent seepage and disintegration of street railway paving.

Write for Illustrated Catalog No. 20.

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Make Your Own Castings

The 'Lectromelt Furnace will melt a charge consisting of cheap scrap and enable you to make all your steel and grey iron castings at less cost, when and as they are needed.

Write for the details

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ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY
Sole Manufacturers of Micanite
Established 1893

68 Church St., New York **542 So. Deerborn St., Chicago**
Works: Schenectady, N. Y.

8-F

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Builders since 1868 of Water Tube Boilers of continuing reliability

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK

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Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes

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BUCKEYE JACKS

High-grade R. R. Track and Car Jacks

The Buckeye Jack Mfg. Co.
Alliance, Ohio

Type R-10

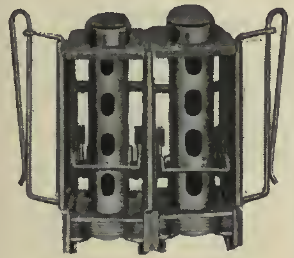
International Registers

Made in various types and sizes to meet the requirements of service on street and city system. Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
15 South Throop Street, Chicago, Illinois

JOHNSON Universal Changer


Adjustable

The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

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Each barrel a separate unit, permitting the conductor to interchange the barrels to suit his personal requirements, and to facilitate the addition of extra barrels.

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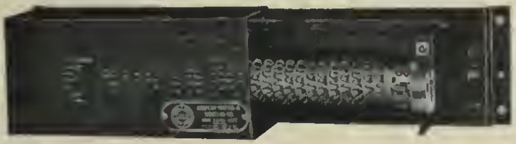
THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED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PS HEATERS

Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
1725 Mt. Elliott Ave., Detroit, Mich.

"Boyerized" Products Reduce Maintenance

- Bemis Trucks
- Case Hardened Brake Pins
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- Manganese Brake Heads
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Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

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Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
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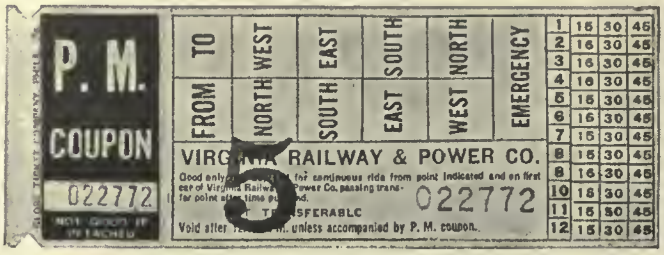
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FROM TO	NORTH WEST	SOUTH EAST	EAST SOUTH	WEST NORTH	EMERGENCY

VIRGINIA RAILWAY & POWER CO.
Good only for continuous ride from point indicated and on first car of Virginia Railway & Power Co. passing transfer point after time punched.
NOT TRANSFERABLE
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Void after [illegible] m. unless accompanied by P. M. coupon.

1	15	30	45
2	15	30	45
3	15	30	45
4	15	30	45
5	15	30	45
6	15	30	45
7	15	30	45
8	15	30	45
9	15	30	45
10	15	30	45
11	15	30	45
12	15	30	45

When Speed Counts

When every corner is crowded with waiting riders, when all the cars are crowded to the doors, when everyone is in a hurry—at rush hours—then Speed Counts.

Globe P. M. Coupon Transfers may be printed with the date on the face of each transfer, although many companies use this style of transfers without dates. The P. M. Coupon is easy to see. This helps the conductor to check up quickly on the transfers received, at the same time preventing transfer abuses.

This results in speedy service, and satisfied patrons.

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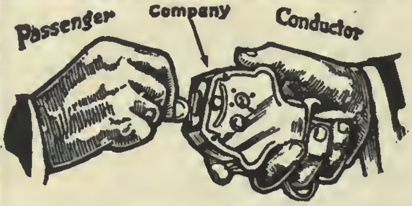

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By the
Passengers

Rooke Automatic Register Co.
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Fare Boxes *Change Carriers*

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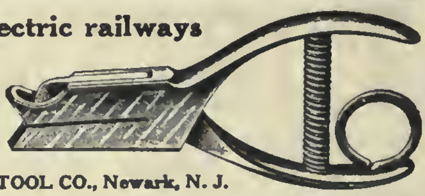
COUNTERS SORTERS WRAPPERS

THE CLEVELAND FARE BOX CO.
CLEVELAND, OHIO
Canadian Branch, Preston, Ontario.

75% of the electric railways use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THERMOSTATS BUZZERS
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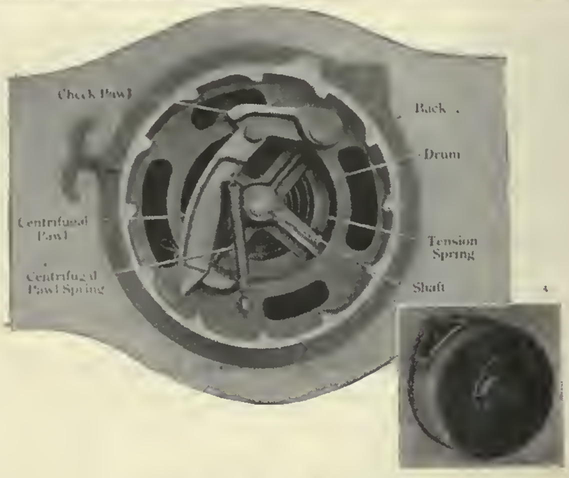
CONSOLIDATED CAR-HEATING CO.
NEW YORK ALBANY, N.Y. CHICAGO



All new catchers are good—

But when they wear so that the pole is checked too late, they're junk. The short fat check pawl of

Earll Catchers and Retrievers

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Like to know the other four? We'd like to tell you.

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WHY NOT TRY
A. GILBERT & SONS B.F. CO.
ST. LOUIS, MO.
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The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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KALAMAZOO, MICH., U. S. A.

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for Electric Railways and Motor Buses.
Unexcelled for ventilation and appearance.
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N-L Products manufactured and sold in Canada by
Railway and Power Engineering Corporation, Ltd.
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The Differential Car

An automatic dump car, an electric locomotive, a snow plow, and a freight car—all in one. Big savings shown in track construction and maintenance, paving work, coal hauling, ash disposal, snow removal, and freight transportation.

The Differential Steel Car Co.
Findlay, Ohio

RAILWAY UTILITY COMPANY
Sole Manufacturers
"HONEYCOMB" AND "ROUND JET" VENTILATORS
for Monitor and Arch Roof Cars, and all classes of buildings;
also ELECTRIC THERMOMETER CONTROL
of Car Temperatures.

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Chicago, Ill.

Write for Catalogue

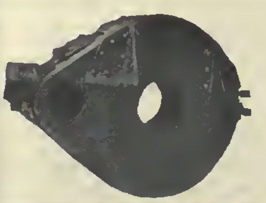
1328 Broadway
New York, N. Y.

PROVIDENCE FENDERS **H-B** LIFE GUARDS
The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents

100 New Users in the Last Nine Months
KASS SAFETY TREADS
HIGH
in efficiency and lasting qualities
LOW
in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.



CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
Jersey City, N. J.

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E. R. J.

POSITIONS VACANT

STOCK clerk wanted familiar with storekeeping methods for a street railway company operating small property in New York City. Make application in own hand writing to P-598, Elec. Railway Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

AUDITOR, 20 years' accounting experience, five years in official capacity, wishes to become associated officially with a Traction or Public Utility Company. Best of references. PW-603, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

ELECTRICAL engineer, age 34, experienced in operating, commercial and executive utility and professional engineering positions and qualified for regulatory and allied problems. Clear record. Good references. Commercial and technical graduate. Married, American. Desire responsible connection with mid- or far-western independent utility or engineering firm. Now available. PW-605, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MR. MANAGER, are you in the field for a superintendent of transportation? If so, you should realize that practical experience is an important factor in the successful handling of this department. The writer of this ad has a proven successful record of nineteen years on city, suburban and interurban properties and can furnish high grade references as to character and ability to get results on any property regardless of size or condition of same; at present with large property; personal reasons for making a change. PW-595, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MANAGER or superintendent of railway, light and power properties, technical education, successful organizer tactful in public relations and very resourceful in rehabilitating properties, excellent references. PW-596, Elec. Railway Journal, 10th Ave. at 36th St., New York.

MASTER mechanic wants position, 18 years' experience rebuilding and maintenance cars, armature winding. Best reference. PW-593, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MASTER mechanic, city or interurban railways, experienced on all branches. Good record, good references. Available after Aug. 1. PW-582, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITIONS WANTED

SUPERINTENDENT of equipment or master mechanic; twenty-three years' experience on city and interurban properties; have handled construction on transmission lines, substations, power plants, track and trolley work; available any time. PW-594, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

SUPERINTENDENT of transportation, at present with a large successful property that has been placed on a sound basis largely through efforts of advertiser, solicits correspondence or interviews with managers of city and suburban properties that require effort and ability to get results. A wide practical experience places me in a position to build up an efficient organization that would be a credit to any property. Also recognized as an economical operator, quick to locate leaks and correct same. High grade references from present employers as to character and ability to get results regardless of size or condition of property. Personal reasons for desiring a change. Will be pleased to make appointments for interview at convention. PW-604, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

AGENCIES AVAILABLE

Individual or Firm Wanted

Well acquainted with electric railway field, to take on sale of a very portable high efficiency reasonably priced arc welding machine. A-602, Elec. Ry. Journal, Leader-News Bldg., Cleveland, Ohio.

FOR SALE

1—500-kw. Crocker-Wheeler **Generator,** direct connected to C. & G. Cooper Heavy Duty Cross Compound Condensing Engine, 20x38x36 in., 135 r.p.m.

1—14x22x24-in. Blake-Knowles Single Horizontal **Jet Condenser.**

1—5x12-in. Outside Packed Plunger, Cameron Boiler Feed **Pump.**

2—Aultman & Taylor Water Tube **Boilers.** 280 hp., 126—4-in. Tubes, 18 ft. long, 2—36-in.x20-ft. Drums, 160 lbs. pressure.

Hartford & Springfield St. Ry. Co.
Warehouse Point, Conn.

FOR SALE

50-Ton Electric LOCOMOTIVE

600 Volt—D. C.

Locomotives are complete in every respect and are in excellent condition.

Full Specifications Upon Request

Hydro Salvage Syndicate
Niagara Falls—Ontario

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Final commodity sales are now being scheduled. Stocks of Quartermaster Supplies are to be offered at auction at Brooklyn, Sept. 27; Chicago, Oct. 18; San Antonio, Oct. 24; San Francisco, Oct. 30. Additional sales will be announced as scheduled.

Important sales of Real Estate, Buildings, Plants and Warehouses will be held at Camp Devens, Ayer, Mass.; Ordnance Reserve Depot, Amatol, N. J.; Ordnance Reserve Depot, Toledo, Ohio; Camp Knox, Louisville, Ky.; and Camp Lewis, American Lake, Wash. Definite dates will be announced later.

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WAR DEPARTMENT

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Air Receivers & Aftercoolers
Ingersoll-Rand Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Armature Coil Equip. Co.
Elec. Service Supplies Co.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.

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Bemis Car Truck Co.
St. Louis Car Co.

Axle Straighteners
Columbia M. W. & M. I. Co.
Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Westinghouse E. & M. Co.

Babbitt Metal
Ajax Metal Co.
Babbitting Devices
Columbia M. W. & M. I. Co.
Badges and Buttons
Elec. Service Supplies Co.
Int. Register Co., The

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Ajax Metal Co.
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General Electric Co.
Gilbert & Sons B. F. Co., A.
St. Louis Car Co.
Westinghouse E. & M. Co.

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Baldwin Locomotive Works
Stucki Co., A.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Heati'g Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Boilers
Babcock & Wilcox Co.

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Elec. Service Supplies Co.

Bonding Apparatus
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Ohio Brass Co.
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Elec. Service Supplies Co.
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Ohio Brass Co.
Railway Track Work Co.
Rail Welding & Bonding Co.
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Roller-Smith Co.

Book Publishers
McGraw-Hill Book Co.

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Johns-Pratt Co.

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Bates Exp. Steel Tr. Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

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National Ry. Appliance Co.
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Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Ackley Brake & Sup. Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

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American Copper Products Corp.

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Worcester Brush & Scraper Co.
Brooms, Track, Steel and Rattan
Amer. Rattan & Reed Mfg. Co.

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Buses, Motor
Brill Co., The J. G.
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American Copper Products Corp.
Bus Seats
Hale & Kilburn Corp.
Heywood-Wakefield Co.

Bushings
National Vulcanized Fibre Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
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Mica Insulator Co.
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Differential Steel Car Co.
St. Louis Car Co.

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Car Panel Safety Switches
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General Electric Co.
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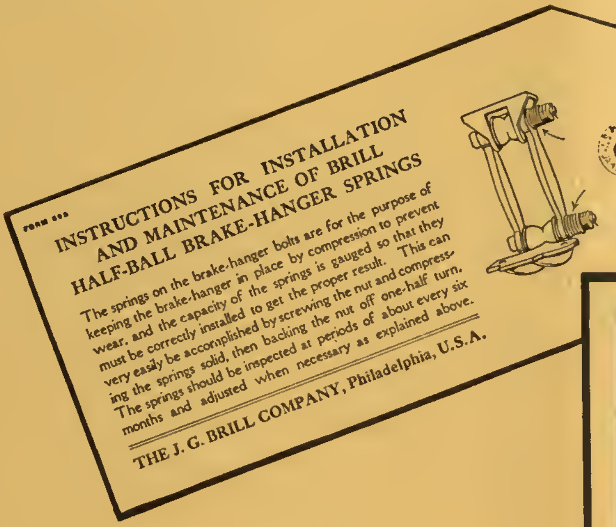

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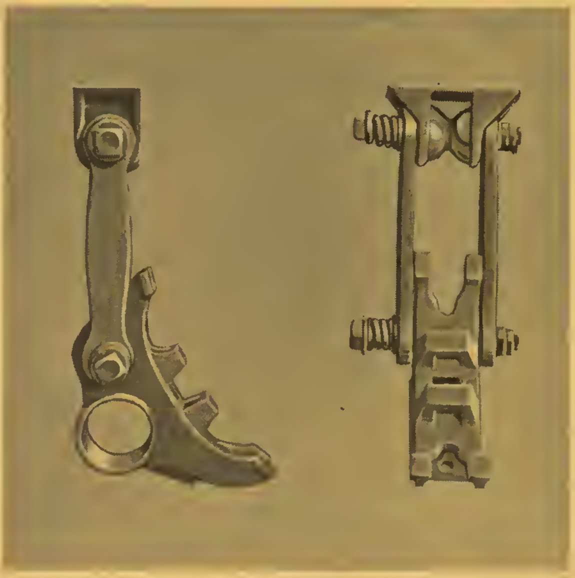

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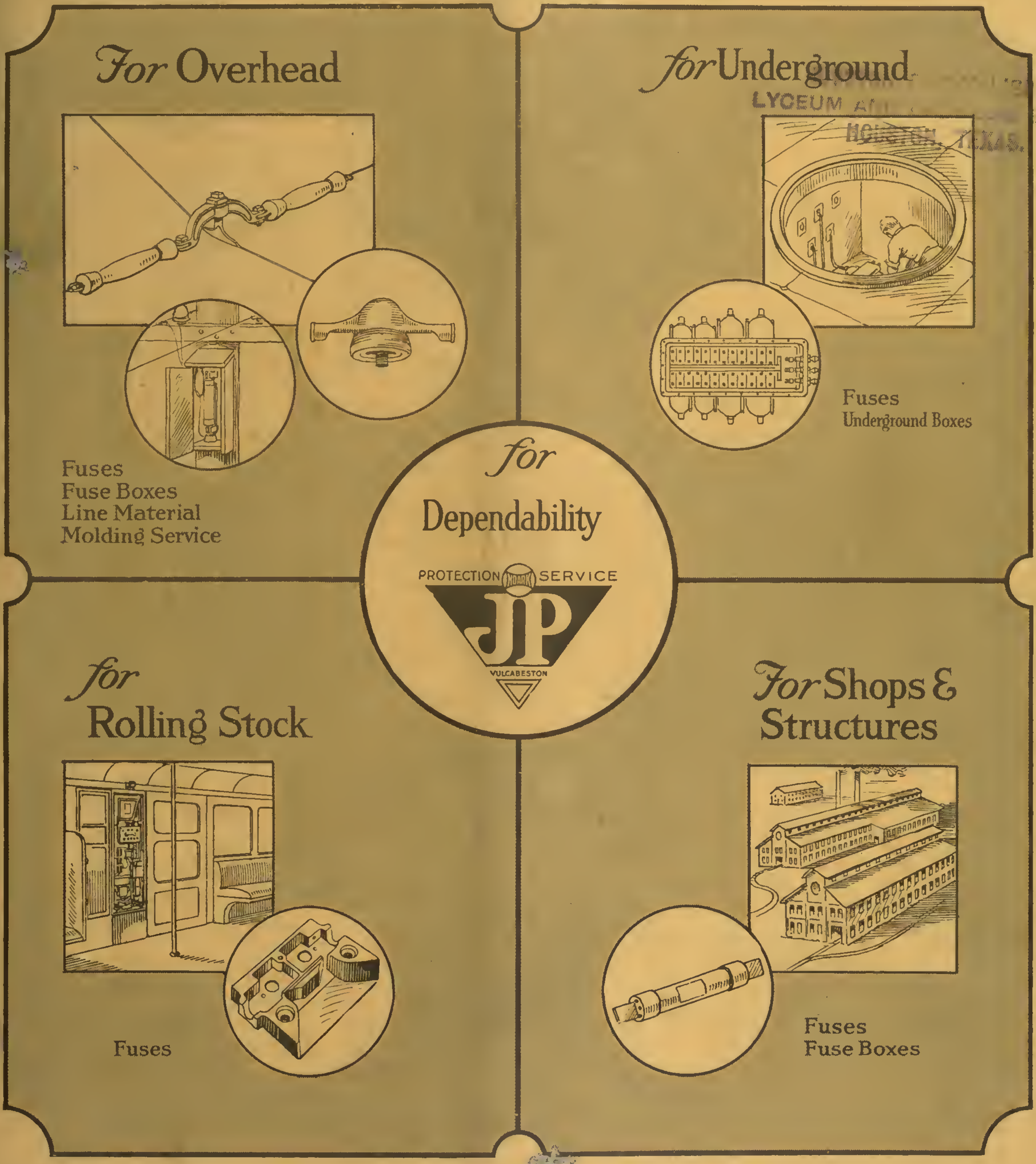

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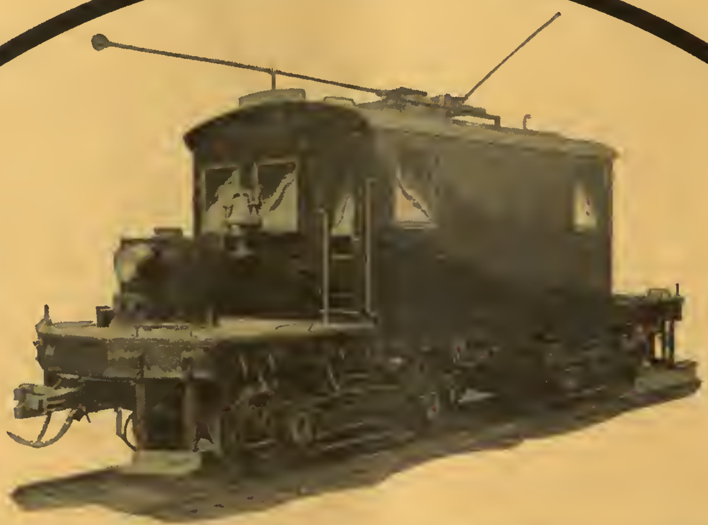

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Annual Convention Number

Next Week

THE annual convention of the American Electric Railway Association is but two weeks ahead, and in accordance with a time-honored custom next week's issue of the ELECTRIC RAILWAY JOURNAL will be the Annual Convention Number.

During the last few years remarkable progress in the design and construction of electric cars and car equipment has occurred. The industry today is actively engaged in the further study and development of its rolling stock. The Convention Number of the JOURNAL will therefore be devoted to this extremely live and important topic.

Developments in car design will be presented from both the transportation and maintenance viewpoints. Drawing information not only from its own large resources, but also from many of the representative operators and manufacturers who are always ready to give liberally of their time to the advancement of our industry, next week's issue represents a broad view of the present status of car design in all of its phases. The aim has been to study the design of the modern car as we may trace development and analyze present tendencies, and to serve as an inspiration for the future, by discussing the thoughts and hopes of those progressive engineers who are constantly striving for a still greater development of the electric rail vehicle.

Read the Convention Number before going to Atlantic City. If the subject matter inspires more active discussions, and causes keener interest in the progress exhibited by manufacturers, its mission will have been fulfilled.

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Journal of Electricity
(*Published in San Francisco*)
Industrial Engineer
(*Published in Chicago*)
Electrical Retailing
(*Published in Chicago*)
American Machinist—European Edition
(*Published in London*)

Number of copies printed 5,875

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.

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Published weekly
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
Printed in U. S. A.

Advertising Index—Alphabetical, 34; Classified, 30, 32; Searchlight Section, 29

WABCO

**Brake
Cylinder
Packing
Cups**

WABCO is the new brake cylinder packing cup material which has revolutionized the packing cup industry.

Until Wabco was discovered in the Westinghouse laboratories, such efficient and economical service as this product has since been giving was unknown.

Wabco Packing Cups have practically banished brake cylinder leakage, resulting in better air brake performance with reduced labor, and less wear, on the part of the compressor.

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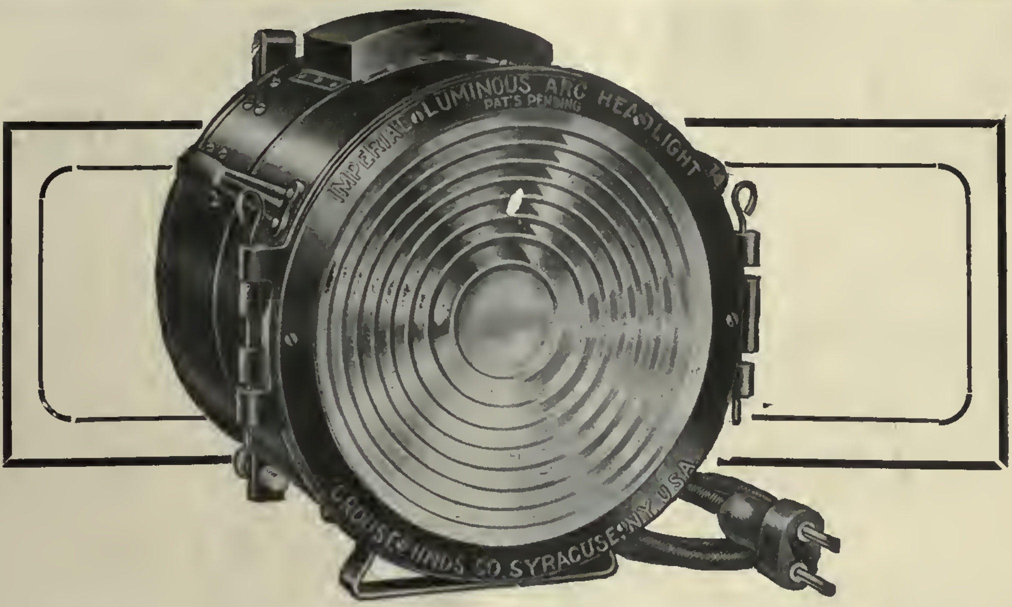
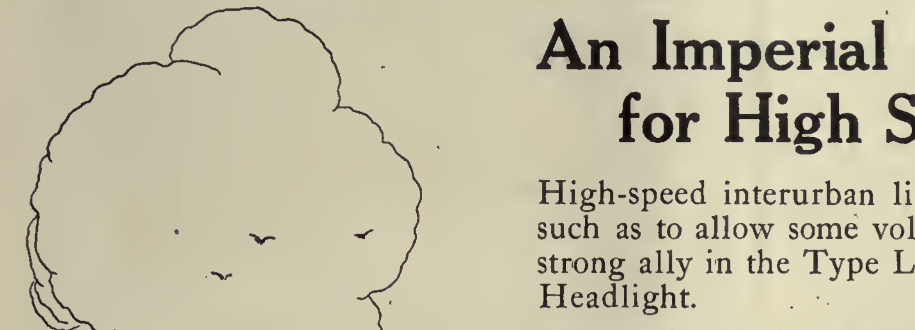
the Folder

Write today for a copy of the folder illustrated above. It explains why you get "Better Service through a Better Packing" when WABCO is used.

WESTINGHOUSE TRACTION BRAKES


IMPERIAL LUMINOUS ARC HEADLIGHT
PAT'S PENDING
CROUSE-HINDS CO. SYRACUSE, N.Y. U.S.A.

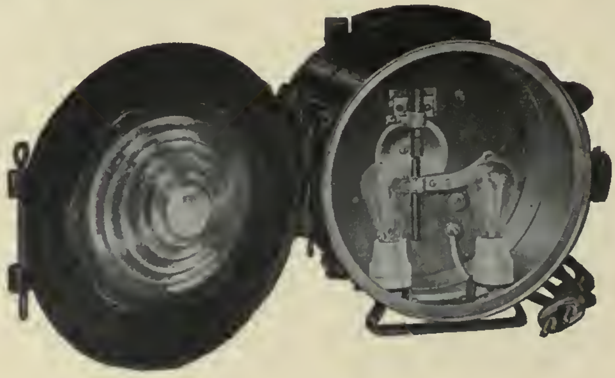
When Voltage Varies—



An Imperial Luminous Arc for High Speed Roads

High-speed interurban lines, with feeder distribution such as to allow some voltage variation, have found a strong ally in the Type LAA Imperial Luminous Arc Headlight.

Motormen have greater confidence with the LAA steady beam of light—and operating officials list its reliable illumination as essential to operating efficiency.



The arc and mechanism are completely separated in compartments. Fumes from the arc cannot reach the mechanism.

Sold Exclusively by

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

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Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulato

Insurance plus
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Have You Finished
the Job Right?

Your personnel has been chosen wisely; your plant has been planned carefully; your methods are the last word in efficiency and your products find an insatiate market. Have you finished the job right?

If fire can damage your plant or accidents disorganize your personnel and drive your customers to waiting competitors, you cannot rest secure.

Insurance is the final and fitting step of the wise executive who finishes the job right. He takes care of today and has the vision to protect himself against the emergency that may come at any time. He is prepared against all contingencies by having adequate insurance for his business in all its branches.

As carefully as you choose your banker, just as carefully should you choose your insurance broker. The one assists, the other safeguards your business.

"He who serves best profits most."

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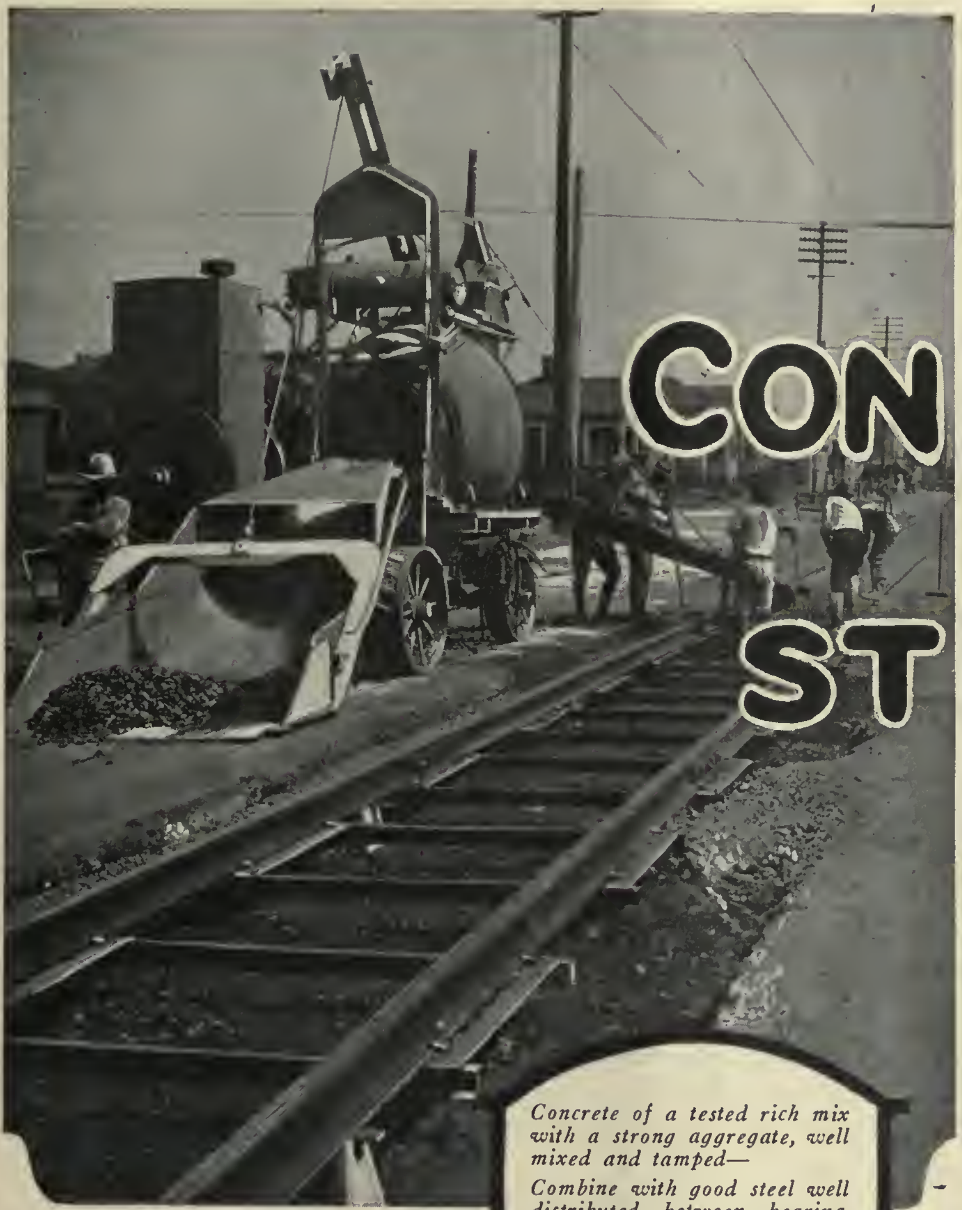

CONCRETE

STEEL

Concrete of a tested rich mix with a strong aggregate, well mixed and tamped—

Combine with good steel well distributed between bearing, reinforcement and tie members. These are the logical permanent materials for the foundation of the best paved track.

There is nothing in such construction to absorb water; to start cracks nor to rot and undermine the rail and joints.

When you hear that such construction is lower in first cost than wood tie construction, the rumor deserves intensive investigation.

Write, or wire, for prices definite shipping date, guaranteed freight rate, and folder on "Costs, Methods and Best Practice in Steel Tie Track Construction."

All Permanent Materials Make Long Lived Track

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Cleveland, Ohio

Canadian Representatives
Sarnia Bridge Company, Limited
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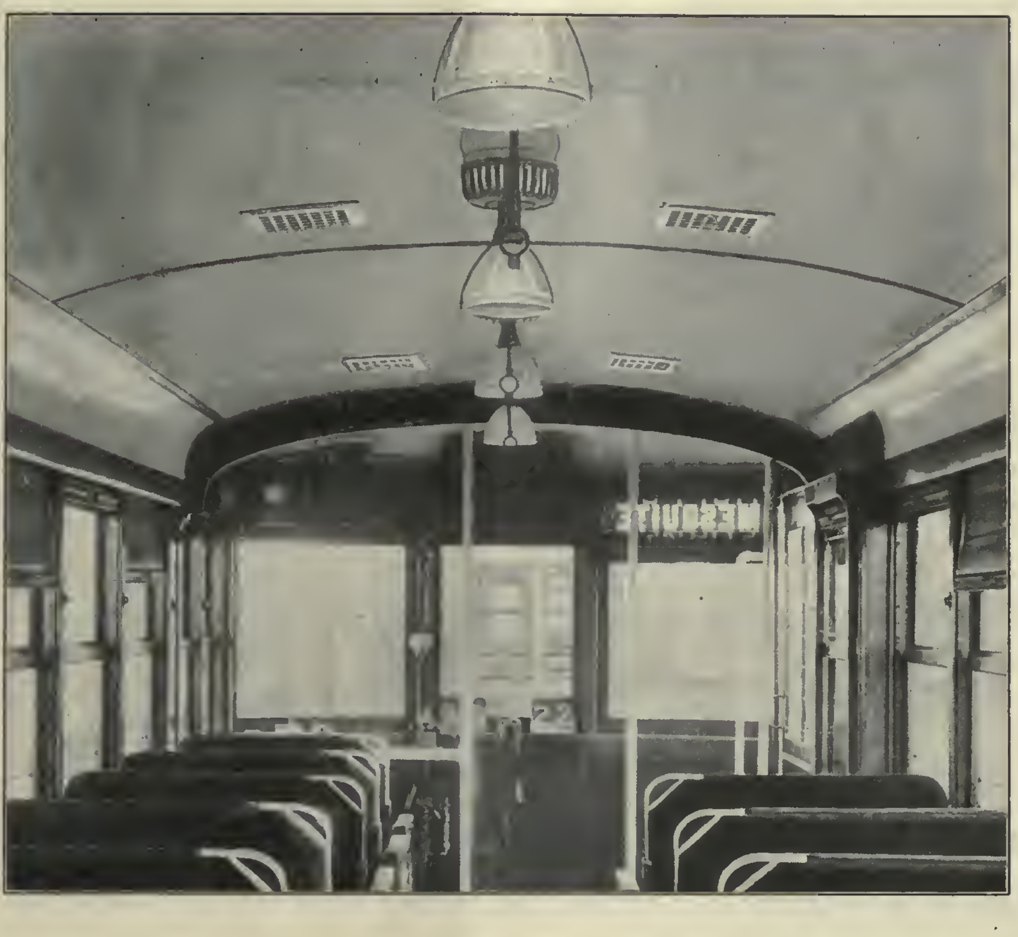
Steel Twin Tie Track

THE
UNA JOINT

It is the result of years of intensive, coordinated development through practical railway engineering and scientific research. We take this occasion to extend our sincere thanks to the many Electric Railway Engineers in this country whose assistance and encouragement have contributed to this accomplishment. The UNA Joint will be publicly shown for the first time at the Atlantic City Convention, October 8-12, space 201.

Rail Welding & Bonding Company
Cleveland, Ohio
Manufacturers of the well-known
UNA BONDS



If one goes out the others carry on!

KEYSTONE

Compensating Fixtures

It's no longer necessary to depend on the old-style 5-lamp series which all goes dark when one lamp burns out. With Keystone Compensating Fixtures fewer lamps are needed and wiring is simplified. Burned out lamps can be located at once and replaced with minimum inconvenience. Headlights can be included in the car lighting series if desired.

Completely described in Catalog No. 7.
Have you your copy?

ELECTRIC SERVICE SUPPLIES CO.

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829 Oliver Building

NEW YORK
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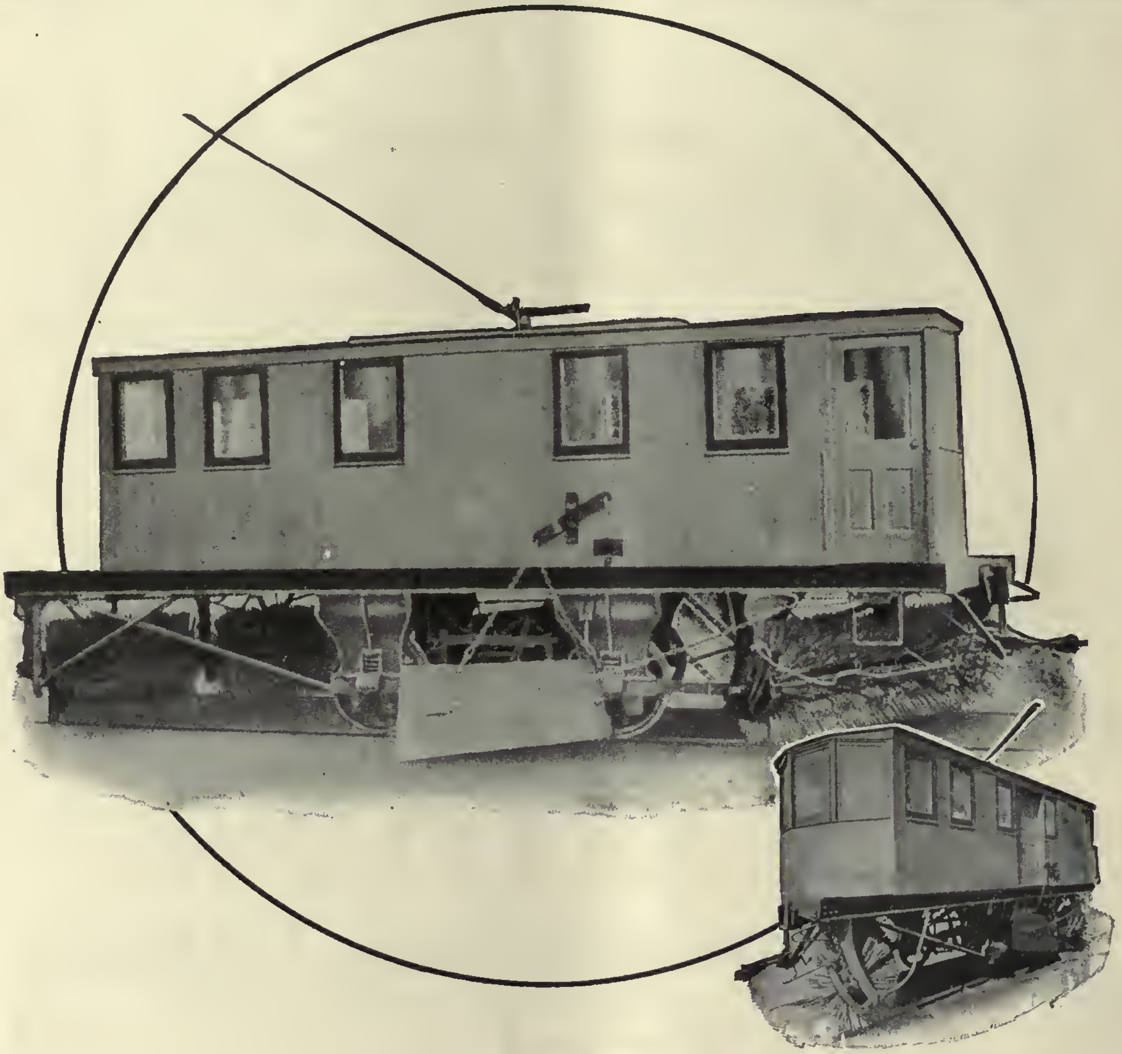
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver
Equipment & Engineering Co., London Eng., Ing S. Belotti & Co., Milano, Italy
L. J. Healing & Co., Ltd., Yokohama, Tokio, Kobe and Osaka, Japan.
Ernest Demoly, Paris, France Elector-Traccion, Madrid, Spain

SNOW!—its Removal



Efficient Snow-sweepers and McGuire-Cummings Mfg. Co. are names linked together in the mind of a majority of America's electric railway men. Fully 95% of all electric snow-sweeping equipment used in the United States and Canada is of McGuire-Cummings make.

The Standard single truck, steel underframe, long broom sweeper shown above is exceptionally strong and rigidly built, handling deep snow rapidly without stalling. The long broom clears both rails and fifteen inches additional on the outside of each track. Each broom is equipped with case-hardened roller bar steel belt chain, with detachable links.

Over 1,400 of these long-broom sweepers are in use in all parts of the world where they have snow to contend with. Sweepers are also built in other types to cover every snow-fighting problem.

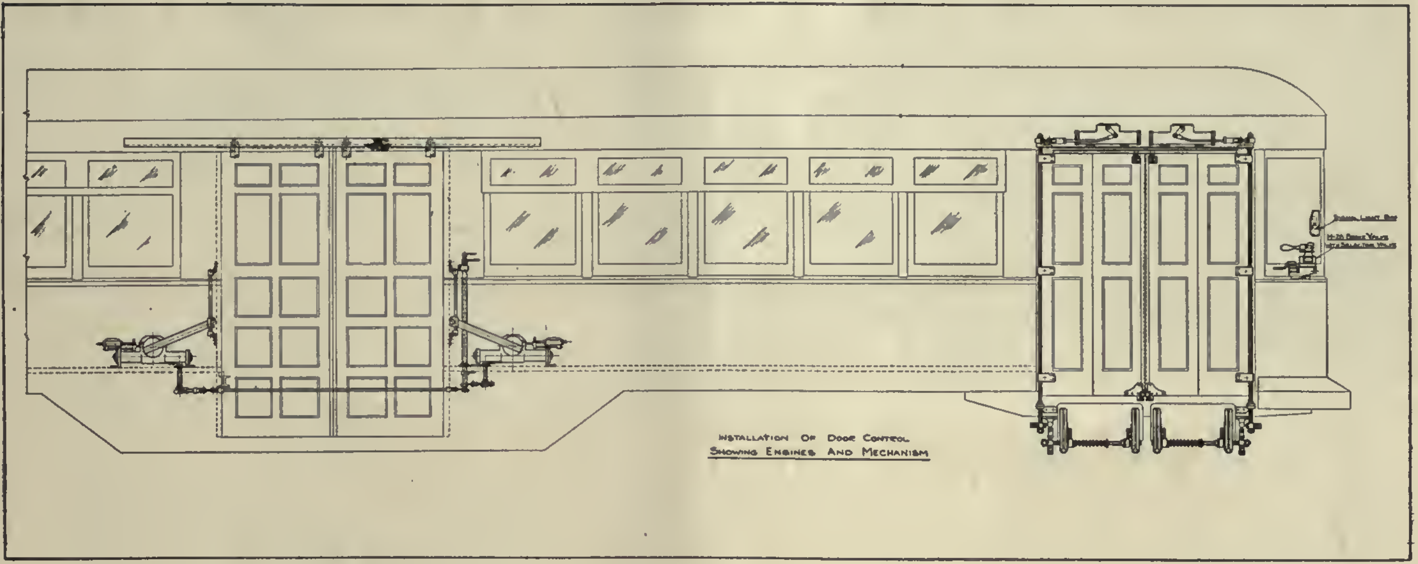
McGUIRE-CUMMINGS MFG. CO.

General Offices

111 W. Monroe Street, Chicago, Ill.

City and Interurban Cars and Trucks, Safety Cars, Combination and Work Cars, Snow-Sweepers, Electric Locomotives.

PREFERENCE



Which?

A hand-cranked automobile or an electric starter?
A hand-cranked door device *or* a pneumatic door engine?

That's preference!

Do not fool yourself into believing that old fashioned methods are "good enough,"—*because really they're not you know!*

The wide-awake operators and engineers of the present day prefer the last word in efficient transportation equipment. That is the answer to why 65,000 or more cars are equipped now with one or more of the popular National Pneumatic Devices. That certainly indicates *preference* for National Pnuematic Equipment.

National Pneumatic Co., Inc.
Originators and Manufacturers
Principal Office: 50 Church Street, New York
Philadelphia—Colonial Trust Building Chicago—McCormick Building
Works—Rahway, New Jersey
Manufactured in Canada by Dominion Wheel & Foundry Co., Ltd., Toronto, Ont.

UNIVERSAL

Rotary Track Grinder

The means to better track

Six salient features are responsible for the efficiency with which it executes its variety of grinding operations. Here they are:

1. Large rubber-tired derail wheels.
2. Outboard bearing on Grinder Wheel Arbor.
3. Tilting Grinding Wheel to grind on angle of rail head.
4. Adjusting outrigger.
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The Universal Rotary Track Grinder has every refinement for the fastest, most efficient and complete track grinding work. It has won its place in the track departments of the larger companies in the country.

It will help you keep your tracks in condition and reduce wear and tear on cars that run on it.

Railway Track-work Company
3132-48 East Thompson Street, Philadelphia

AGENTS:

Chas. N. Wood Co. Boston	Electrical Engineering & Mfg. Co. Pittsburgh
Atlas Railway Supply Co. Chicago	P. W. Wood New Orleans

Equipment & Engineering Co.
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Better track—
the cost—an ant hill!
the saving—a mountain!

AJAX

Electric Arc Welder

Designed for reclaiming rails and special work at low cost. Light, rugged and simple.

RECIPROCATING

Track Grinder

For removing corrugations and smoothing out joints at first signs of "cupping." One of these machines should be in service on every road to insure smooth track.

ATLAS

Rail Grinder

Low cost, economical rotary grinder for removing surplus metal after building up joints or special work with "Ajax" Welder.

HERCULES

Rail Grinder

The new radial swing frame grinder that does everything a flexible shaft grinder can do but does it better and at less cost. Grinds at any angle.

Gear and Pinion Lubricants

*Excerpts From Report of Tests**

WINTER GREASES — "The only greases that proved to have a low enough cold test to stand the chill of the steel gears and stick to the gear teeth without hardening or flaking off were Galena Perfection Compound (identification No. 9) and Galena Winter Gear Grease (identification No. 5)."

SUMMER GREASES—"The most satisfactory summer grease proved to be Galena Summer Gear Grease (identification No. 4). The results obtained were directly opposite to all other summer grades of greases tested. The current input was exceedingly low and the speed reached normal soon after the test began. It proved in every detail the most efficient and economical grease tested."

"The energy consumption curve of the samples showing the lowest power consumption was used as a basis of comparison, and the amount of energy required by the other samples in excess of those of this basic sample were determined. The Excess Annual Power Cost to operate 4 Gear Car 350 days per year, 18 hour period per day, with cost of power at 1 cent per KW. Hr., ranged from $10.92 to $46.97 on summer test, above Galena Summer Gear Grease, and from $47.18 to $96.74 above Galena Winter Gear Grease, on winter test."

"The lubricating qualities of some of the greases were not such as to recommend them for the lubrication of the high priced gears and pinions used in service on the electric railways, especially on high speed lines, as the abnormal temperature increases prove that while they stick to the gear teeth, they do not lubricate them so as to decrease the frictional wear. Such greases are power consumers and a detriment to the equipment generally."

**Tests conducted by a Professor of Electric Railway Engineering, recognized by the industry for his ability as an electrical and mechanical engineer. Samples of 12 greases made by different manufacturers were used, each sample being numbered to prevent identification during test.*

Galena-Signal Oil Company

New York Franklin, Pa. Chicago

and offices in principal cities

How do you select your motor brushes?

Grade A *Grade B2* *Grade D*

They Look Alike, But—

There's more to a brush than its appearance.

G-E Carbon Brushes are founded upon research to produce a superior brush for G-E motors. They are constantly being watched and tested to insure that the original standard be maintained.

The three grades meet all requirements of G-E railway motors. But the selection in each case must be correct, dependent on operating conditions. Our specialists on brush application will give you this engineering advice.

By using G-E Carbon Brushes you not only solve commutation problems but help maintain the original quality of your G-E motors.

General Electric Company
Schenectady, N. Y.
Sales Offices in all large cities

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION

40-241

GENERAL ELECTRIC

New York, Saturday, September 22, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 12

Public Service Starts the Cars

SINCE last Wednesday the Public Service Railway has been working night and day to clear the tracks of dirt and asphalt, get men back on the job and resume operation. But this is being done under conditions as of July 31, when the cars were put in the barns, except that wages are 20 per cent higher. This procedure came with the compliance of the company with a mandatory injunction of the Chancellor, the highest judicial officer of the state, directing the company to start operations not later than Monday, Sept. 24. The Chancellor's opinion was a strong statement of the equity of the matter, though it is believed by many that the injunction could have been successfully contested. He maintained that the company was under obligation to provide service regardless of loss or profit and announced that in the event the company did not obey the order he would consider receivership proceedings on Tuesday. Chief Justice Gummere earlier said that while it is true that the company has an obligation to fulfill to the public, the public also has an obligation to the company, and that there is no way legally that any company can be compelled to continue giving service at a loss.

But for various reasons the company chose to obey the Chancellor's order rather than carry the case to the United States Supreme Court. Suffice it to say that no progress was being made. Politics had so gotten into the situation that it appeared impossible to get any general approval of the company's settlement plan. Several of the more important communities had called off negotiations altogether. Of course, one advantage of complying with the order is that the company is meeting the demand of many of the cities to resume operation and talk settlement plans afterward.

If nothing else has been gained to date by the shutdown, two facts have been pretty well established in most of the communities of the state. People now know that they must have the trolleys. And they know that they cannot have good bus service when supplied by an irresponsible bus organization.

The buses have shown their value and also their limitations. They have not been able to handle the peak loads. The crowding has been intolerable. People all over the state, in numbers, have been saying they would gladly pay a 10-cent fare if the railway would resume operation. Even the bus men are glad, in a way, that the cars will soon be running, for they have been sorely pressed. The bus men who were operating before the shutdown have made but little if any more profit since the strike than before, because the excessive loading and the necessity to keep running continuously have told heavily on the physical condition of their buses. Moreover, they have suffered serious losses of individual income because the outsiders called in for emergency operation have taken their share out of the bus pool but have not made proper turn-in to it, and because they were operating just about as many buses before the strike as could make any money on a 5-cent fare. This last is one important reason why bus service was not expanded more than it was.

To attempt to indicate what is ahead in the situation would be speculation, as the picture in Jersey is changing almost momentarily. But further developments in the next few weeks will be watched with interest. It is to be hoped, of course, that with the experience of the last seven weeks in mind the public of New Jersey will be disposed to see to it that public officials give the railway a fair hearing and a fair operating basis. New Jersey is bound to be a center of transportation interest for some time to come.

Things Look Different in the Calm Light of Facts

THE conclusions of the Grand Jury directed to investigate the causes of the very bad accident on the Fifth Avenue elevated of the Brooklyn-Manhattan Transit Company in June, when two cars fell off the structure, have been rendered, and no one has been found to be guilty of criminal negligence in the matter. Although "an exhaustive study of the case was made from every conceivable angle" the jury evidently found no evidences of neglect in the maintenance of either structure or cars, because no charge of that nature is mentioned in the report.

This is especially interesting in view of the charges freely flung at the railway officials and transit commissioners by Mayor Hylan immediately following the accident. He said the guard timbers were rotten, the structure defective, etc., and that the Transit Commission knew these conditions prevailed. Such accusations would be made in the heat of excitement only by one predisposed to flay those upon whom the burden of responsibility fell. Of course every one knows Mayor Hylan's attitude in this direction, but few would wish to believe that any man would seek to further his political aims by trying to capitalize such a disaster. Things looked very different to those charged with fixing responsibility for the accident after all evidence and information had been marshalled to calm unbiased view.

The fact is that cases where cars on any of the elevated lines have left the structure in an accident are very rare. In the entire history of New York's elevated roads, extending back over forty years, there is only one previous case involving a passenger train, so far as the writer of this editorial can recall, and only one case in Chicago.

The finding of the jury, published in the news columns of this issue, contains suggestions for further safeguarding elevated railway operation. Of course, the company will go to the practical limit in taking new measures, in the light of this experience, to avoid possibility of recurrence of such an accident in the future.

Sweep Out the Operating Cobwebs

IT IS a truism that almost any outsider with some practical knowledge of electric railways can go over a property and find one thing after another which deserves correction, if not elimination. This does not mean, necessarily, that the operating staff is incompetent. It does, however, point to the common human failing of letting the cobwebs of tradition gather in the more remote corners of the job.

In checking over a large property recently, route by route, one group of investigators found a surprising number of such cobwebs in the form of derails and safety stops. These derails and stops had doubtless been established for some good reason decades ago. Perhaps it was the desire to placate a local authority after an accident, or it may be that the practice dated back to a period when there was some railroad or important highway crossing which no longer existed. Whatever it was that gave reason for the stop had disappeared. But the years went on. The original municipal and railway officials resigned or retired. Highways were regraded and paved. Hand-brake cars were followed by air-brake cars. Streets were better lighted, signals were installed, and so forth. Yet apparently it had seemed to be no one's job to question the continued validity of these stop regulations which had been established beyond the memory of the current staff, although unbroken compliance with these regulations slowed down schedules and annoyed the patron.

Here was clear proof for the need of a periodical checking up on all practices. It may be added that the larger the property, the more likely will such a housecleaning be required, for it is on the large property especially that the employee down the line feels too remote from the management to initiate a questioning of long-established custom.

Regular Appropriations for Advertising

ADVERTISING for traffic and use of advertising space for general public relations purposes are coming more and more to be considered regular parts of the business activities of an electric railway. Not many companies have as yet put this on a systematic basis, however, whereby a consistent, steady program of reaching prospective customers and the general public with sales and good will discussion is carried out. In other words, few railways have reached the point of setting aside a percentage of their gross revenue, as most other businesses do, for advertising expense. Yet this, logically, will be the procedure ultimately. Advertisers in the mercantile and most other lines have learned that spasmodic advertising is not nearly so effective as the regular, periodic, consistent program—though it must be a program that is attractive, interesting and informative.

If one admits the wisdom of this manner of approaching the task, the question then comes up as to what is a proper allowance for advertising. The answer is that we do not know, yet. It is a matter to be determined by experience, but the main thing is to set aside a definite percentage, however small, and make a start on a consistent program. If the first guess proves to be worth while, then the percentage can be increased periodically, as long as it proves profitable.

One prominent city and suburban railway executive who has given this matter much thought considers 1 per cent of the gross not too large an amount. One of the fastest growing interurban roads in the country is expending approximately 3 per cent of its gross for advertising. Another interurban with less opportunity for building new traffic is spending 1½ per cent. One of the rapid transit railroads is spending one-half of 1 per cent. And so it goes. The main thing is to get out after traffic by advertising, by traffic agents, by every known means of selling. But do it consistently and effectively. And the more intensely the better.

M. O. Proponents Short on Constructive Ideas

ADVOCATES of public ownership of utilities are certainly as biased and unfair in their views as they claim the privately owned utility men are. This was especially evident in the proceedings of the conference of the Public Ownership League of America held in Toronto Sept. 10 to 13. A considerable part of the program was taken up by speakers whose main purpose seemed to be denunciation of the private utilities as the basis of fostering municipal ownership doctrines.

In fact, the reports of the conference do not indicate that a great amount of discussion of a constructive nature took place. The same old ground was gone over again, and the speakers reiterated the familiar arguments as to why private operation is a failure and municipal operation is—or ought to be—such a success.

It does no good to keep reciting, as one speaker did again, the familiar formula, "The story of the transit situation in the city of New York might properly be described as the history of a crime." From this sentence one can guess the rest of his talk.

One speaker did make some observations worth noting. He said, "In many cities the people have not dared to expand their public activities because of dishonesty in politics." He emphasized that the one thing that will ruin the policy of public ownership of public utilities is the expediency of politics—"the craving of mediocre men who desire to get their snouts into the political nose bag or to feed at the political trough."

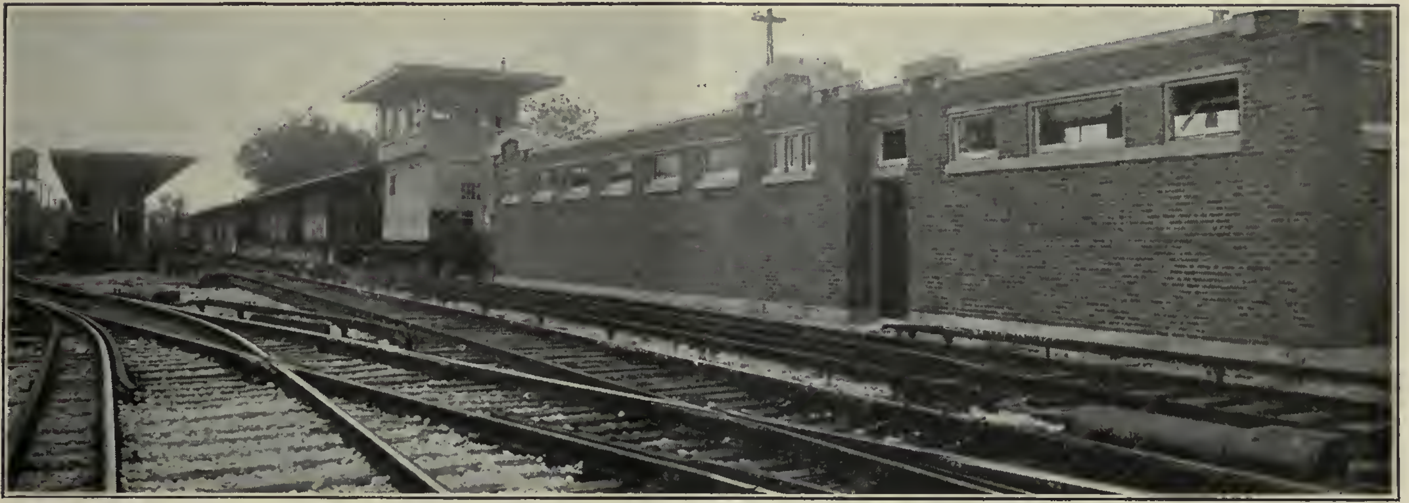
Honest administration of utilities is the very foundation of success, as in any business. The crook or grafter has no place in management, whether public or private. But the man who is responsible to the private owners of a property, and whose acts are subject to review by a competent board and also by representatives of the public, does not and cannot have the opportunities before him for mulcting the public that are presented to public officials in control of m.o. utilities, who, while telling what great things are being accomplished, may actually be running the thing into the ground. And the public is vulnerable because it has no competence to judge results for itself.

Another point made was that "the inability of the public to see the value of paying high salaries for highly technical positions is a menace to public ownership. Men of marked ability must man publicly owned utilities, for efficient and effective management and supervision of public utilities is as necessary as that provided to operate utilities privately owned."

This last is a lesson that unfortunately has not been too well learned by private utilities, particularly referring to department heads and principal assistants. The success of any utility, public or private, depends on the intelligence and the integrity of the men who manage and operate it, more than on the method of control.

Chicago "L" Interlocking Plant Speeds Train Movements

New Electro-Pneumatic Interlocking Plant at Howard Street Embodies the Latest Design for Rapid and Flexible Switching—One Towerman Has Control of All Train Movements at Point Where There Is Considerable Train Make-up and Other Main-Line Activity—Operating Features Are Described



Looking South Through the Plant; the Brick Building on the Right Is the Trainmen's Room

SERVING a four-track main line which converges into a two-track main and a two-track yard lead, the new electro-pneumatic interlocking plant at Howard Street on the Chicago Elevated handles 580 train movements a day. Howard Street is the north city limit of Chicago, and besides being the city fare limit there is a storage yard of 140 cars capacity from which the majority of the north-side trains are dispatched for the rush hours.

The right-of-way from the city to this point has a four-track line, the last 7.8 miles being over the new rock ballast roadbed recently opened, as described in the ELECTRIC RAILWAY JOURNAL of March 10, 1923. North of Howard Street through Evanston to Wilmette the two-track right-of-way is of similar construction, but with overhead conductor, instead of the third rail which is used in the city. Howard Street is, therefore, the logical point for making up trains, adding to city-bound trains, cutting off cars from outbound trains, collecting fares, and changing from third rail shoe to overhead trolley or vice versa. It is also at this point that freight handled during the night is switched from the freight track to the northbound main line.

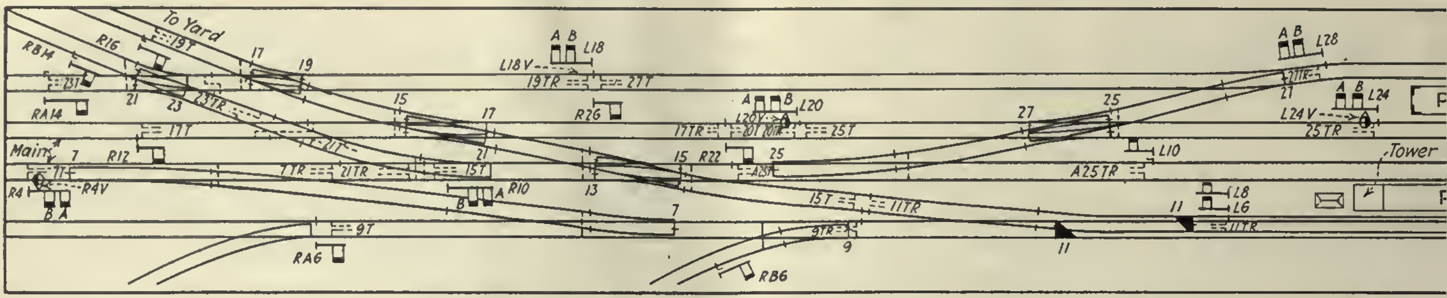
Each of these features was a factor in determining the design and capacity of the plant. A two-island station with four "pockets" facilitates collection of the fares. Accessibility to all station pockets from either the four-track main, the two-track main or the yard leads formed the real need for a plant of this type. With "cuts" and "adds," "put-outs" and "lay-ups," relay switching and main-line movement, this plant is one of the busiest spots on the system during the rush periods. A gauntlet track in the west pocket which serves the heavy freight industries connects into each end of the plant, making a five-track system through the plant. Third rail is used as the power conductor, and this adds to the complication of the layout. Insulators, inclines, special ties, feeder and jumper cables had to be provided for this phase of the plant.

ASSEMBLING THE PLANT

As a result of the high degree of co-operation and co-ordination between the various departments concerned the assembly of the parts was carried out with little difficulty. The track special work is of 90-lb. A.S.C.E. rail. It was reassembled on the job, while the third rail of 80-lb. section was placed on insulators in anticipation of power requirements. The assembly of the movements, targets and interlocking work proceeded with uniform rapidity. Each of the various parts of the signal assembly came marked with the name and number of the switch of which it was a member. Trackwork was delivered in the same convenient form, which facilitated assembly. Some complication was added, due to the slight grade and curve met at the yard entrance.

The signal system is the electro-pneumatically operated three-wire type, air being used to actuate the movements, with electricity as the controlling element.

Permanency was the important feature in the construction of the plant. The tower is of fireproof construction throughout; the framing is of steel channels, cross-braced and covered with metal lath. Concrete stucco has been placed on the lath and a finish of fine granite applied to the stucco. The overhang on the second floor enlarges the operator's room to give ample space, while clearance is provided beneath for trains on either side. A feature of the tower is the specially designed type of folding windows, any section or pair of which may be moved laterally to a corner or side



The Complete Layout of the Interlocking Plant Is Shown in the Diagram. All Train Movement

The Tower Is Designed to Give Train Clearance

post. The operator is thus afforded a clear view in any of three directions, while the generous overhang of the eaves shades the vision.

The main operator's room contains the interlocking machine, which is located in such a position that a clear view of the tracks is had in all directions. An illuminated track diagram mounted above it repeats the actual setting of each track switch and signal, changing automatically as the levers of the interlocking machine are moved. A telephone, a clock and an air gage are mounted on the track diagram frame directly in front of the operator's position. A lavatory is provided in a section of the room 3 ft. below the level of the main floor, so as not to obscure the vision.

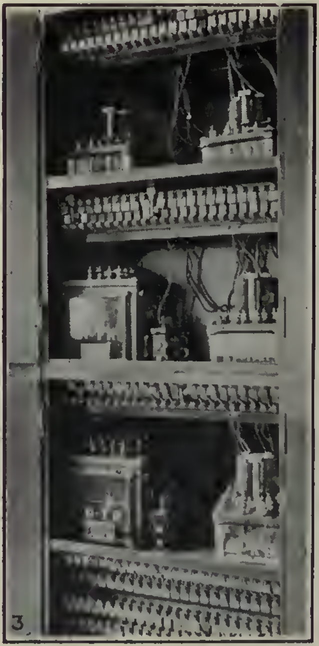
SWITCHBOARD MOUNTED IN CONVENIENT POSITION

The switchboard controlling the electrical connections is in such a position that the operator may read the meters and throw the switches without moving a great distance from his normal position before the machine. Mounted on the panel are a d.c. ammeter and d.c. voltmeter, low-voltage battery switches, 600-volt d.c. compressor and governor switches, and a complete set of fuses protecting the 600-volt lines. An a.c. cutout cabinet and "Square D" switches are mounted on the right edge of the panel. These switches control the alternating current, which is obtained from two separate outside sources, thus providing for protection in case of failure of either supply.

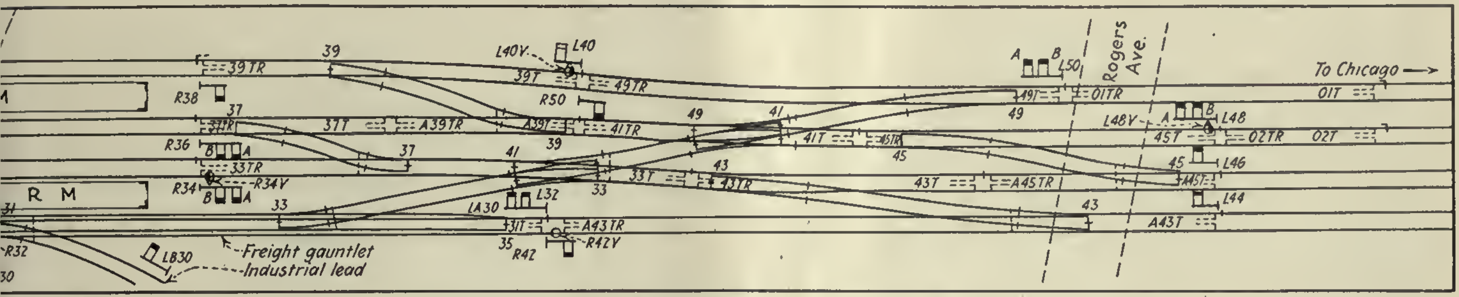
Air compressors, governors, relay cabinets and meters are located on the first floor of the tower, while the battery room and maintainer's supply locker are located in the basement. Here duplicate sets of 140 amp.-hr. batteries are located, which supply current for the control of switch and signal apparatus. Three air compressors supply air at the rate of 114 cu.ft. per second for the operation of the plant. Governors con-

No. 1. The Switchboard Controls the Alternating Current, the 600-Volt Direct Current, and the Storage Battery Circuits.

No. 2. The Operator's Position Is Arranged for Clear Vision, with the Illuminated Track Diagram Above the Machine.



No. 3. Section of Relay Cabinet, Showing Relay and Terminal Racks. There Are Eighteen Similar Sections.



In the Entire Area Are Controlled from the Tower Located at One End of the Station Platform

trol the action of these pumps so that a minimum pressure of 70 lb. and a maximum pressure of 85 lb. is assured. Cooling coils and drainage tanks are inserted in the air line outside of the tower.

The relay cabinet consists of eighteen sections of racks similar to the one illustrated. Terminal racks are hinged so as to be more accessible. Compactness with ample room is the feature of the design. Flexible stranded wire of ample length is used for the relay connections to allow the relays to be lifted up and out of the case for inspection. Wires from the relays to the machine and the track diagram are carried in a metal frame. Below the relay cabinet is a series of 6-in. chutes which carry the wires to the large distributing manhole located under the tower.

EXTERIOR WIRING IS IN CONDUIT

Twenty ready-built concrete manholes located throughout the plant serve as distributing centers for the wires to the various movements. Vitrified clay conduit of 4-in. x 4-in. duct is used to connect the manholes with each other and the tower manhole, while wood trunking serves as a protection to the wires interconnecting the individual switch movements and manholes. Complete protection for every wire from the machine to its terminus at the movement is thus assured. Multiple conductor cable with braided covering is used throughout.

Extra heavy galvanized 2-in. pipe is used for the main air line, with drainage tanks set in concrete containers placed at intervals throughout the line. Where the air line is apt to come in contact with ground it is wrapped with burlap and pitch, preventing electrolysis to a large extent. Emergency air lines are run to bypass any break or leak in the main air line, which has been provided with cutout valves so arranged that such a damaged section may be cut out without interference with the rest of the plant.

This Type of Dwarf Signal Is Used Throughout the Plant

The switch movements have adjustable lock areas and 5-in. diameter cylinders, and are equipped with cutout valves, so that after a switch movement is com-

This View of the North End of Plant Shows a Portion of the System Controlled, Including the Two-Track Main and Yard Lead pleted the air pressure is cut off automatically. However, should the switch point open up, the air valve will again cut in the air pressure, throwing the switch to the proper position and locking it. This action saves air, and provides a safety feature as well.

Indication boxes are of the pole changer type and embody the polarized signal selection and switch control. This system of interlocking insures the closure and locking of all switch points in a "line-up" before the governing signals can be cleared. If a switch point opens up or is out of adjustment, the signal and trip governing that line-up would go to "stop" position automatically. Detector bars are not used on this installation, a.c. track circuits actuating track control relays taking their place. When a train is over a switch the track relay is de-energized and the lever controlling the switch is locked in position, until the train has passed out of the limits of that track circuit. Indication lights on the machine located immediately beneath the operator's levers, as well as the track diagram lights, afford an additional check on the operator. Under each switch lever on the machine is an electric light indicator which shows green when the track circuit controlling the lever is unoccupied. The track diagram previously referred to is a conventional layout of the plant with different colored paint representing the various track circuits. A small lamp controlled by the track circuit relay is mounted on the diagram at the center of each circuit, and is illuminated when that particular circuit is clear.

PROTECTION AFFORDED AGAINST WRONG MOVEMENTS

The towerman or operator may follow the movement of all trains through his plant, note the positions of the switches by indication lever lights, and the positions of the trains by the track diagram. Should he attempt to move the wrong lever at such a time the mechanical machine lock would prevent him.

The machine proper has fifty-one levers mounted on the front of the case, which is locked and the key placed under seal. In case of trouble in the machine, the seal is broken and the case unlocked. A report of an unusual occurrence of this kind is sent to the dispatcher. At each end of the machine is a push button which operates whistles at either end of the plant, calling the maintainer to a telephone. A system of whistle signals is also used to call trains from the yards. Immediately in front of the operator, overhanging the machine, is a pair of cords with handles which operate a siren whistle located on the outside of the tower. Should an emergency arise, the whistle is blown as a signal for all trains within hearing to come to an emergency stop. This same order applies over the entire system through interlocking plants. No derails are used on the main tracks, a track trip being used to bring the train to an emergency stop. When the trip is in "stop" position and a train passes over, the trip valve on the train air-line is opened, setting the brakes to emergency.

Since the plant was put in service many flexible train movements have been made possible, all of which aid traffic. For example, a southbound elevated train makes a station stop and collectors enter the cars to collect fares for the city zone. Another "L" train follows into the other southbound station pocket. The track diagram indicates the approach of a North Shore train going south. To speed up traffic, the towerman lines up the northbound main for reverse traffic operation, and runs the North Shore train around the two "L" trains. Much time is saved daily in this way by using "line-ups," which were impossible with the old plant operated by five switchmen, and more flexible and safer operation is obtained at far less cost.

An Idea for Off-the-Car Peak Power Load

Suggestion for Applying the Heater Load to Valleys in the Motor Curve and Cutting It Off During Maximum Acceleration Period

By J. A. HORTON
New York, N. Y.

OF THE total energy used by an electrically propelled, electrically heated car during an average winter trip, from 20 to 35 per cent is dissipated by the heaters. The percentage depends upon the active heater capacity, upon the existing heating regulations, upon the weight of the car and upon the efficiency with which the car is handled. The explanation of the high ratio is, of course, that the heating load represents a constant demand on the energy source, while the propelling load is intermittent with periods of stopping and of coasting.

In order to maintain a certain temperature in a car of given inside volume, operated under given conditions of schedule, traffic and heat regulations, the expenditure of a certain amount of electric energy is unavoidable, although its magnitude may be minimized by striving for conditions favorable to electric heating —such conditions, for example, as are established by adopting thermostatic control and by enforcing wise regulations in regard to ventilation and opening of doors.

Ordinarily, the heating load is superimposed upon the motor load, raising every point of the total energy curve by an amount exactly equal to the heating load and making no distinction between peaks and valleys of the starting, running and stopping cycles. Thus, the heater loads, as ordinarily disposed, raise the load peak of every car and tend to raise the power station load peaks.

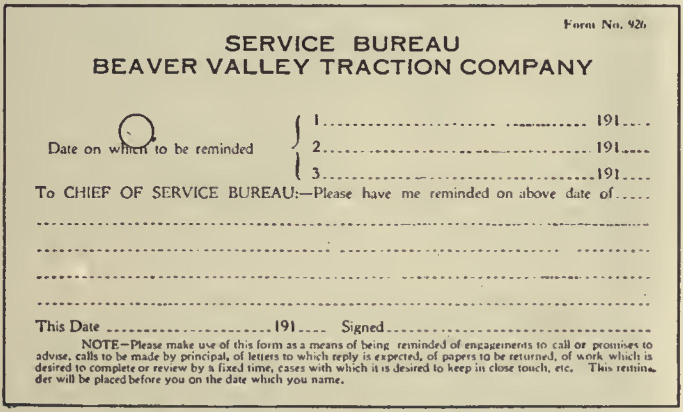
This suggests the idea that the opening and closing of the heater circuits be governed, to a certain extent, by operation of a series relay dependent for action upon the motor current and so adjusted as to keep the heater circuits open during all periods of acceleration. Under this condition the heater current would be subtracted from the present peak current of every car operating cycle. The heater energy consumption per car would be decreased a little, but not enough to reduce materially the effectiveness of the heaters. It is conceivable that the relay might be adjusted to close the heater circuit only after the accelerating period had passed and the cycle had extended well into the motor curve. By keeping the heater load off the motor load peak, the holding of the maximum heater current to a minimum value would become a matter of less moment. Indeed, a larger value of heating current, in conjunction with thermostatic control, might even be considered an advantage in that the greater current would enable the heaters to heat the car to the cut-off temperature more promptly.

Simultaneous with decreasing the current peak demand per car, there would be a tendency toward improving line voltage conditions, especially in congested localities, and toward stabilizing rotary-converter adjustments of power factor. The greatest effect, however, would be the direct one upon the prime-mover stand-by capacity necessary in providing for station load peaks. Take, for example, a road operating a schedule of 100 cars, each of which might consume 10 amp. heating current. The total steady drain due to the heaters would be 1,000 amp., which, at a voltage of 600, would be more than 600 kw. A 600-kw. generator with its turbine and auxiliaries would cost much more than would the devices required to transpose the heater load off the power peaks of the 100 cars, and the figures become more impressive as the number of cars is increased. A 2,000 car schedule, for example, imposes upon any existing station loads—peaks and valleys alike—a heater current of 20,000 amp., or 12,000 kw.

The modern trend is toward light cars because they absorb less energy by reason of less dead weight to be hauled. It takes just as much energy, if not more, to heat a light car as it does to heat a heavy one, under like conditions. Therefore as the ideal light-weight car gradually becomes realized, of more moment is the relatively larger consumption of the heaters, as well as their relatively greater influence upon load peaks. Thermostatic control has accomplished the feat of supplying heat only as needed. Let the relay contribute its part toward maximum efficiency and minimum peak ascendency.

Novel Call-Up File

AS A MEANS of insuring that engagements will be kept, a novel method has been installed at the offices of the Beaver Valley Traction Company, New Brighton, Pa., by W. H. Boyce, general manager. When any individual has made an engagement for a specific date, or has any topic about which he should take action, he fills out the necessary information upon the 3-in.x 5-in. card shown in the illustration. This form is placed in the outgoing mail basket and no further attention need be paid by the executive. These cards are kept by the service bureau, which is a consolidation of all the clerical and stenographic forces at the company's office, being filed under their respective dates. The head of the service bureau reminds each person on the date of the proposed engagement, merely by placing the card on his desk. In case the engagement is not completed, or supplementary action must be taken, this is noted upon the second or third lines provided on the card, which is then returned to the service bureau.



Form No. 926

SERVICE BUREAU
BEAVER VALLEY TRACTION COMPANY

Date on which to be reminded
1...191....
2...191....
3...191....

To CHIEF OF SERVICE BUREAU:—Please have me reminded on above date of.....

....

....

....

....

This Date ....191.... Signed..................................

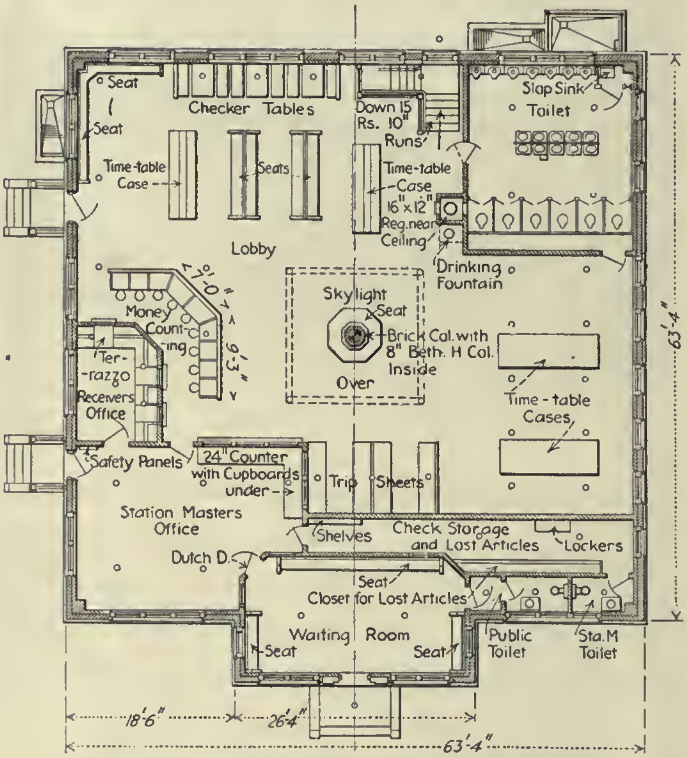
NOTE—Please make use of this form as a means of being reminded of engagements to call or promises to advise, calls to be made by principal, of letters to which reply is expected, of papers to be returned, of work which is desired to complete or review by a fixed time, cases with which it is desired to keep in close touch, etc. This reminder will be placed before you on the date which you name.

This Card Is the Basis of an Effective Call-Up System

Attractive Division Headquarters at Medford

Recently Erected by the Boston Elevated Railway at a Cost of About Fifty Thousand Dollars —Plenty of Room for Men

THE accompanying illustrations show the very attractive division headquarters building, recently completed in Medford, Mass., by the Boston Elevated Railway. It adjoins the Salem Street carhouse of the surface division of the company and contains a waiting room for passengers, the station master's office and accommodations for the platform men and other employees operating out of the Salem Street carhouse.



Plan of Ground Floor of Lobby Building, Medford

The building is one story in height but with a commodious and well-lighted basement, which contains a shower bath and dressing room as well as the heating plant of the building. During the summer, when this heating plant is not in service, hot water for the shower bath is provided by a gas heater which automatically furnishes the required supply. The rest of the basement is occupied by lockers.

The building is approximately square, being 63 ft. 4 in. over all in both front and side dimensions.

The waiting room is in the front of the building and the station master's office to the left with a separate entrance, but with a door connecting with the waiting room. Both of these rooms have toilet facilities. The check, storage and lost articles department adjoins the station master's department, but there is a window opening into the public waiting room. It is well provided with shelves and cupboards for the storage of articles.

The receiver's office adjoins the station master's office but also has window openings into the employees' lobby. Directly in front of these openings is a money counting table with nine compartments, where the conductors make up their money and records. Also adjoining the

These Division Headquarters Have a Pleasing Exterior. There Is Plenty of Room for the Men to Study the Run Sheets and Wait Between Runs

station master's office are the counters for making up trip sheets.

The remainder of the lobby floor, which is light and spacious, is taken up with seats, time-table cases, a row of checker tables and a toilet room. Daylight lighting is from a rotunda and large side windows, and the artificial lighting is supplied by ceiling lights and reflectors.

The interior finish of the walls is attractive, being yellow brick paneled by dark red bricks. The woodwork is of North Carolina pine, the center pillar being cased with dark red brick. The floors are of red top concrete, with a floor hardener incorporated.

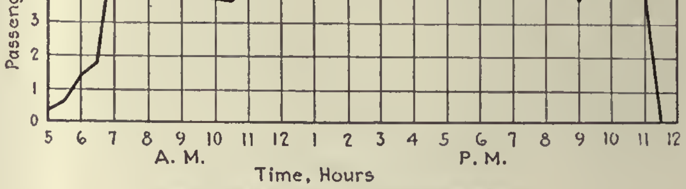
The foundations and first story girders are of reinforced concrete, above which the building is of brick with tapestry tile facing of dark maroon and light colors. The building has concrete lintels and a slate roof. Its cost, erected, was about $50,000.

The area containing this lobby building and adjoining carhouse and storage tracks is inclosed by a chain link fabric fence, 7 ft. high. This fence is made up of No. 6 wire in a 2-in. mesh and is supported on 2½-in. pipe posts and 3-in. pipe corner posts, set in concrete. At the top of the mesh wire there is a 1⅝-in pipe top rail, and above this will be five strands of barbed wire, carried on extension arms. This construction makes a practically impenetrable barrier against mischievous persons.

Mid-day Travel in England

THE accompanying characteristic daily load curve of the tramways of Hull, England, appeared in a paper on "Tramways from a Traffic Point of View," presented by E. S. Rayner before the Institute of Transport of Great Britain at a recent meeting held by that organization.

Mr. Rayner explained that this curve may be taken as typical of the tramways in the larger cities in England outside of London. The peaks represent approximately 50 per cent of the total passengers carried, and the load factor, i.e., the mean load, referred to the maximum load is 54 per cent. The morning peak equals 18 per cent of the total peak load, the mid-day peak is 25 per cent of the total peak load, and the afternoon peak is 46 per cent of the total peak load. The rides per capita of population per year in Hull are 213. London has only two peaks, a morning and an afternoon.



Daily Load Curve in Hull, England

In spite of the extension of bus lines, the speaker did not feel discouraged about the tramway situation and pointed out a continual increase in the traffic in Great Britain, as shown by the following figures:

		Increase
1900	1,065,374,347	....
1914	3,301,814,820	2,236,440,473
1922	4,256,268,692	954,453,872

Improvements Possible in Subway Construction and Operation

A Continuous Platform Between Two Tracks Instead of Side Station Platforms Is Suggested—With This Construction Station Stops Can Be Changed to Suit Altered Conditions, and Other Advantages Are Obtained—The Merits of Skip Stops for Local Subway Service Are Also Set Forth

By Philip Sachs
Assistant Engineer New York Transit Commission

ONE of the principal shortcomings of the present system of subway design is its lack of elasticity, caused by the fact that the subway stations are fixed as to location and length of platforms. The original subway in New York was designed to accommodate eight-car express trains and five-car locals. The platforms have since been lengthened to accommodate ten-car expresses and six-car locals. We could well stand another increase in train length, and it is hard to tell when the limit will be reached, but each such step is costly and wasteful. The train length is an important factor in determining the spacing of stations. Some stations are only four blocks apart now. In the case of a five-car train, for which the line was originally designed, the train occupied 25 per cent of the distance between stations. A ten-car train would occupy 50 per cent of the distance. This condition tends to choke up the line, increase the train headway and reduce the efficiency of operation.

A subway is built not as a temporary expediency, but for permanent use, and to be of real utility it should conform to the life of the city, or that section of it which it traverses. This cannot be said of the present system, which is destined to remain in its original shape for all time. Some sections of the city, like Washington Heights and the Grand Central zone, have undergone tremendous development since the completion of the original subway, yet the station locations are the same now as they were then.

To overcome these objections and gain other advantages, it is proposed to provide a continuous station platform for the entire length of line. It can be shown that this improvement will involve little or no additional cost when a subway is constructed. A certain type of structure of the New York City subway system will be used as a basis.

Local stations average eight blocks apart and are about two blocks long. The platforms then occupy 25 per cent of the length of line. Since there are two platforms to a station, each about 12 ft. wide, to make these continuous would involve an enlargement of the present cross-section by the width of two platforms for 75 per cent of the length of line. However, if we stagger the uptown and downtown stations and place them end to end on an island platform instead of alongside of each other, they would occupy 50 per cent of the length of line, and if made continuous would only leave 50 per cent of one platform to be accounted for, or an average width of 6 ft. This can be accounted for as follows:

Fig. 1 is a standard cross-section for a certain type of two-track structure between stations and shows that the distance from center line of track to inside face to wall is 7 ft. 3 in. Wherever there is no duct bench on the side, the corresponding distance is 6 ft. By placing the ducts underneath the platform, we would, therefore, gain 1 ft. 3 in. on a side, or a total of 2 ft. 6 in. Inasmuch as this duct bench extends between stations only, the average saving is 2 ft. 6 in. x 0.75, or 1 ft. 10½ in.

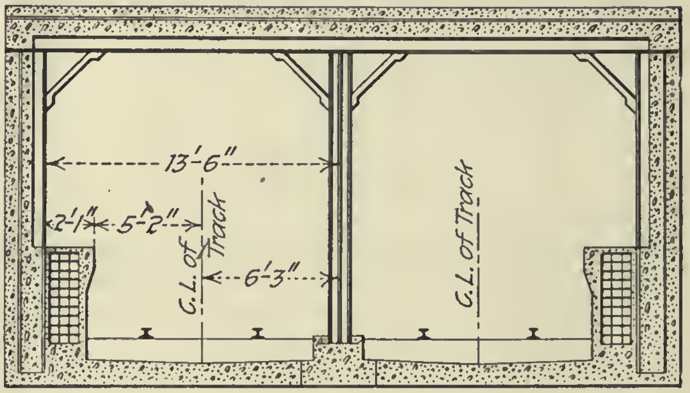


Fig. 1—Typical Cross-Section of a Two-Track Subway

Referring to the same figure, it will be seen that the distance from center line of track to center of center column is 6 ft. 3 in. The corresponding standard distance to edge of platform is 4 ft. 9½ in. Through a center platform, we therefore save twice the difference between the above two figures, or 2 ft. 11 in. Adding to this figure 1 ft. 10½ in., we arrive at a total of 4 ft. 9½ in.

In other words, by averaging the width of the present structure at stations and between stations and placing the ducts in the center, we get a uniform structure of constant cross-section, with a center platform substantially 12 ft. wide, which compares favorably with platforms of any station on the existing lines. It is important to bear in mind that any portion of this platform is to serve only one set of trains, that is, either uptown or downtown, and that no portion of it will be shared laterally by two trains. In other words, if we have a station at Forty-second Street, the uptown trains will stop between Forty-second and Forty-fourth Streets, while the downtown trains will stop between Forty-second and Fortieth Streets.

Suitable entrances may be provided through overhead mezzanines. Four-foot stairways placed at frequent intervals would serve the purpose.

The extra depth of structure made necessary to provide room for overhead entrances may be utilized to provide a continuous mezzanine without additional expense, for once the street is excavated to proper depth, it would be just as expensive to backfill the trench as to provide a mezzanine in the space. A portion of this mezzanine may be utilized for special purposes, such as stores, storage or some pipe structures.

In Fig. 2 is given a cross-section of the proposed construction with a mezzanine. The bents are about 5 ft. centers, center columns 15 ft. apart, and longitudinal girders 25 ft. long, involving a cantilever of 5 ft. on each side, and a space of 5 ft. between girders for the purpose of permitting subsurface structures to pass through.

Actual estimates of cost cannot be made until a complete design has been prepared. But the writer is confident that a structure like this, including a continuous mezzanine, can be built for the same amount of money that it would take to build a structure similar to the present type.

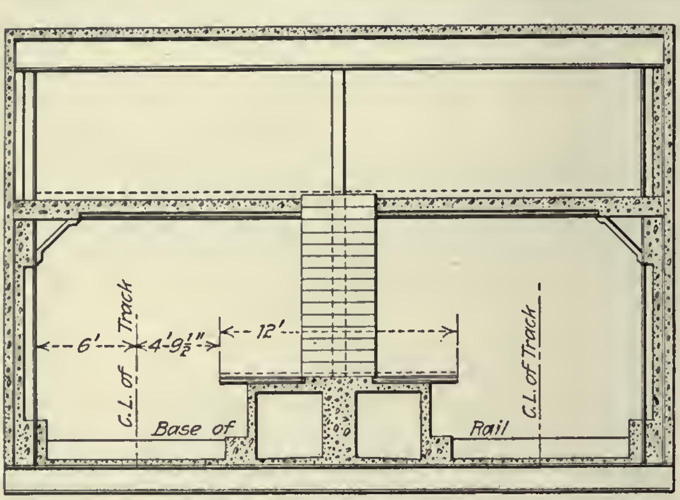


Fig. 2—Cross-Section of Proposed Design with Continuous Center Platform Serving Both Tracks

In Fig. 3 is shown a plan of a four-track local-express system. It will be noted that the local tracks are inside, with a continuous platform between them, while the express tracks are on the outside with intermittent side platforms. This arrangement does away with the elaborate approaches and curved tracks of the present. At the same time, it provides the express platforms with much of the flexibility possessed by the local platform. Under the new system the transfer between uptown and downtown local lines would be facilitated, but the transfer between express and local trains would have to be by walking through the mezzanine. This, however, should hardly be regarded as a disadvantage. By imposing a slight obstacle upon the transfer facilities, we would materially reduce the volume of transfers and thus get a better distribution of traffic, and a fuller utilization of the local tracks.

With entrances and exits every other block, we could increase the distance between stations two blocks without increasing the average length of walk, for, when stations are ten blocks apart, the distance between their extreme entrances is only eight blocks. As a result of increasing the distance between stations, it may be found practical to employ a higher maximum speed, which, of course, would be reflected in the schedule speed. The reduction in the number of stops between 25 per cent and 50 per cent would further produce a material increase in the schedule speed. This would tend to reduce the advantage of the expresses and increase the popularity and patronage of the locals.

Stations, of course, could be located anywhere, but great care should be exercised in fixing these locations with a view to operating conditions rather than local considerations, and a firm policy should be adopted to adhere to these locations and not to be swayed by the clamor of local or real estate interests for stations. This, of course, applies to any other system as well.

From an operating standpoint, stations should be located as far apart as possible, and the spacing should be as uniform as possible. A uniform spacing of stations for given districts, based upon volume of traffic, tends to equalize station congestion throughout the line and prevents extreme congestion at isolated points, which under the present system is apt to undermine the efficiency of the entire line. A policy like this is really essential for the smooth, efficient and economic operation of trains. It would also discourage agitation for new stations, for a new station would mean a relocation of every station in the district and perhaps on the entire line, which, of course, should not be done except at rare intervals and for good reasons.

The safety features of this plan also should not be overlooked. With a continuous platform, accidents to passengers due to fires on trains could be entirely avoided, for the moment a fire is noted the train would be brought to a standstill and the passengers let out.

This type of structure will inject elasticity and flexibility into a transportation system. Starting with a five-car train when a line is completed, we will gradually increase the train length until it reaches ten cars in say five years. By this time the line may be ripe for a general readjustment of stations. All stations will be pushed further apart on account of the longer trains now in use. If an error was made in the original location of a station, we shall have an opportunity of correcting it. If a section has undergone unusual development, it will receive special attention. We may then proceed to increase the train length, if there is a demand for it, until the practical limit has been reached.

SKIP STOP OPERATION ANOTHER SAVING

The present local-express system while highly desirable in some respects is equally objectionable in others. The express trains can transport traffic more quickly and cheaply than locals, but their popularity tends to defeat the very advantage that makes them popular. Practically 100 per cent of the local passengers change for the express trains at express stations, and the crowding and congestion caused by it are responsible for most of the delays and breakdowns, which result in lower schedule speed and increased headways.

Another shortcoming of the system is the unequal distribution of traffic between the expresses and locals. The local trains can hardly be regarded as an independent system. Their function is mainly to feed the expresses, and an observation of conditions at many points of the line will show that while the expresses are over-congested the locals are half empty. As a result, while we have four tracks, from the standpoint of capacity we have hardly more than two.

To overcome these and many other objections, it is proposed to operate local trains on the basis of alternate trains making alternate stops. In other words, every train will stop at one station and skip the next one, while the following train will reverse the process. By bringing the stations somewhat closer together than they are spaced now, and providing them with end entrances, the maximum walk to and from the stations will not be increased; at the same time the schedule speed would be improved to such an extent as to compare favorably with the speed of the local-express of the present.

At the same time, the train headway will be materially reduced, for while one train is stopping at a station, the train behind, instead of having to wait outside the station for the first train to pull out, will stop several blocks back at another station, and when it will reach the station in question will find a clear road.

The train headway is composed of two elements—(1) running headway and (2) station headway. The running headway is the time interval between two consecutive trains moving on one track in the same direction; the station headway is the additional loss of time due to stopping at stations. It can be proved that under the most exacting requirements of the block signals, running headway can be kept down to one minute with absolute safety. The station headway, however, imposes a loss of another minute as follows:

Acceleration	14.0 seconds
Retardation	9.2 seconds
Station stop	30.0 seconds
Miscellaneous	6.8 seconds
Total	60.0 seconds

The reduction of this station headway has been the aim of operating engineers for many years, but in spite of much effort and the introduction of many devices, including time control signals, the working headway is still two minutes, the same as it was many years ago, although the theoretical headway is supposed to be about a minute and a half. By adopting the method of operation here proposed, we would cut down the station headway at least in two, for while one train is stopping at a station, only the train immediately back of it will be delayed to the extent of the station stop. The third train reaching the station will only have to be separated by one running headway from the second one. In other words, the time interval between two alternate trains will be equal to two running headways, plus one station headway, and the average headway between two consecutive trains will be one running headway and half a station headway.

The operation of this system is shown on the diagram, Fig. 4. On this diagram, horizontal dimensions represent distances and vertical dimensions time. Each horizontal space represents 250 ft., or one block, and each vertical space represents twenty seconds. Stations are indicated by heavy lines on the bottom of the diagram. The curves represent train performances, and are based upon the following assumptions:

Maximum speed	35 miles per hour
Acceleration	1.25 miles per hour per second
Retardation	1.9 miles per hour per second
Station stop	30 seconds
Length of train	500 feet

Trains as well as stations are designated *A*-1, *A*-2. *B*-1, *B*-2, etc. *A* trains will stop at *A* stations, and *B* trains at *B* stations. In practice they will similarly be designated.

It will be noticed from these curves that the time interval between any two alternate curves is three minutes, or an average headway of a minute and a half.

This method of operation will furnish us with the equivalent of a reservoir station without its objectionable features of turnouts, short radii curves, elaborate station approaches and extra tracks. Like a reservoir station this method of operation will reduce the influence of station stops upon headway.

An analysis of the effects of this method of operation upon the various functions of the railroad follows:

Signal System—Although local tracks on the present system are not protected by signals throughout their length, the increased capacity of the proposed system as well as the higher speed employed will make such protection indispensable. A signal system has therefore been laid out which is shown diagrammatically on the upper portion of the drawing, Fig. 4, and which conforms in essence to all requirements of a standard block signal system. The length of overlap was taken as 500 ft., and is equivalent to the braking distance and an excess of about 10 per cent. The vertical lines on the line *A*-2 represent the signals set up by the moving train, i.e., the danger signals are shown by solid lines and the caution signals by dotted lines.

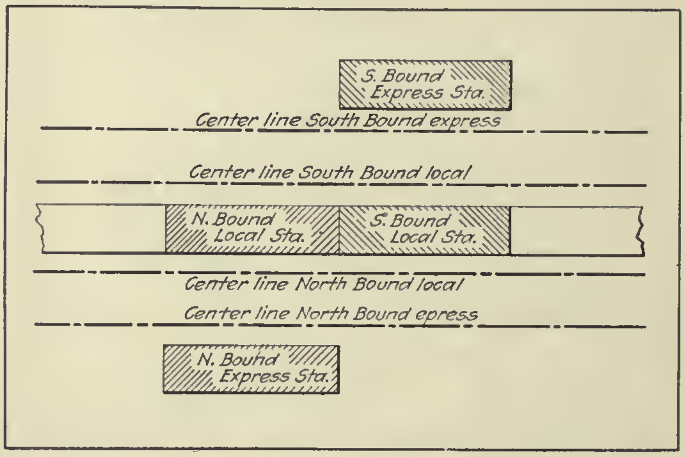

S. Bound Express Sta.
Center line South Bound express
Center line South Bound local
N. Bound Local Sta.
S. Bound Local Sta.
Center line North Bound local
Center line North Bound epress
N. Bound Express Sta.

Fig. 3—Proposed Arrangement of Local and Express Platforms at Express Stop

It will be seen that at any point there are two danger signals and one caution signal separating two moving trains, and that there is an interval of ten seconds or more between the forward end of a moving train and the nearest caution signal ahead. An examination of these curves will also show that we can have a standard block signal system on local tracks that will operate with perfect freedom, without the constraint that is now felt at express stations, without reducing the block length at stations and without having to resort to the time control signals.

It would also be possible to lay out a signal system at random with nothing but the braking length to be guided by and then lay out stations where we choose and still be able to maintain a ninety-second headway. Similarly, we shall be able to relocate a station without having to change the signal system.

Capacity—On the present system ten-car express trains and six-car locals are being operated, making a total of sixteen cars. At two-minute headway, the capacity of this system would be 16 × 30 = 480 cars per hour.

However, not all the locals are operated full. In fact, it is maintained by traffic experts that the locals are useless as far as capacity goes, that they merely serve as feeders for the expresses and carry no independent traffic to speak of. An assumption, then, that the effective capacity of the locals is 50 per cent of the nominal should be regarded as conservative. On this basis we have ten express cars and three effective locals, or a total of thirteen cars, and the capacity corresponding to it—10 × 40 = 400 cars per hour. In other words, this method of operation would give us a four-track capacity on two tracks.

Furthermore, this capacity merely represents the initial capacity of a highly elastic system, which can be expanded by increasing the train length to the maximum feasible limit.

Schedule Speed—Three factors will combine to raise the schedule speed of this system as compared with that of the locals of the present system: (1) The elimination of the express station will remove the most important cause for delays, congestion and high headway; (2) the increased distance between stops and block-signal protection will make a higher maximum speed possible; (3) the reduction in the number of stops.

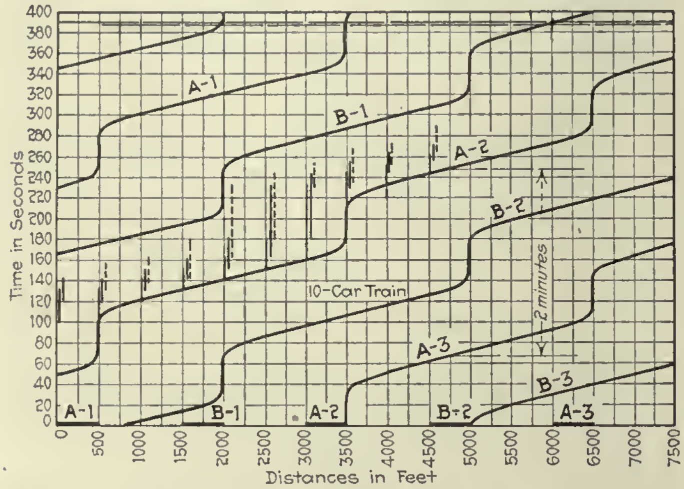


Fig. 4—Distance-Time Graph Showing Alternate Stop Plan of Operation with Signal System for Ten-Car Trains

As a result of these, the schedule speed of the proposed system should compare favorably with the local-express speed of the present system for a great majority of cases, and will show but a small loss when compared with express speed.

Power Consumption—As is well known, acceleration constitutes the principal drain upon the power supply, and in the case under consideration, amounts to about 75 per cent of the total. By reducing the number of steps about 40 per cent, we would reduce the power consumption 30 per cent.

Another source of economy in the power supply will become apparent from an examination of the curves on Fig. 4. It will be noticed that any train on leaving a station will be 1,500 ft. from the nearest danger signal, or forward end of nearest train. Inasmuch as the train ahead is moving at full speed at the same time as the train in question is accelerating, the distance between them will continually increase until the next station is reached. If one train is for some reason delayed at a station it will maintain a caution signal at the next station back. That means that there will be no reason for any train stopping between stations as a result of traffic congestion and a motorman upon receiving a clear signal will be sure to find a clear road to the next station, except for motor troubles or causes other than traffic congestion. The combined saving as a result of these two features should amount to at least 40 per cent.

As a result of a reduction in the power consumption of 40 per cent, the required power plant capacity will correspondingly be reduced.

Other Operating Expenses—Substantial economies will also be effected in the cost of rolling stock, maintenance of way and equipment, and operating expenses.

CONCLUSION

While the two improvements suggested in this paper are to a certain extent independent of each other, with distinct advantages for each, it is only through a combination of the two that the greatest benefits, leading to a solution of the transportation problem, will result.

Removable Posts for Safety Zone

A NEW type of safety zone is being given a trial in the national capital by the Washington Railway & Electric Company. One installation has been made at the southwest corner of Fourteenth and F Streets, N. W., flanking the east side of the Willard Hotel, and three others are planned to make the experiment complete under different traffic conditions.

As shown in the illustration, three 6-in. iron posts are used, placed 25 ft. apart, imbedded 2 ft. in concrete and projecting 4 ft. above the street level. The posts are painted white with black stripes, to attract the attention of vehicular traffic in the daytime, and oil-burning lamps with red globes are placed on top at night. White lines painted on the pavement also mark the zone.

No chains are used to connect the posts, as practice in Washington indicates that the potential danger of loose end chains in accidents increases the import of the collision or accident.

The metal posts are solidly imbedded to withstand impacts with vehicles, yet are removable so as to permit the passage of parades or other mass formations.

In the brief period of its operation, it has been shown that the new system serves its purpose of keeping vehicular traffic away from those about to board or alight from street cars, and also allows easier entrance and exit than if inclosed with a fence or railing.

Striped Iron Posts for Safety Zone in Washington

Washington now has five systems of safety zones—the simple painted rectangle, the painted rectangle with warning lights fixed slightly above the pavement at the corners, the permanent concrete raised platform, the removable wooden platform and this new system.

Setting Standards for Pull-Ins

In Nashville, Tenn., Pull-Ins Have Been Reduced Nearly Two-Thirds in Two Years—One Factor in This Has Been the Use of Competition for Good Records Among Inspectors

CONVINCED that careful inspection is an important element in improving service, J. J. Connors, carhouse foreman Nashville Railway & Light Company, has devised a simple, effective plan for stimulating competition among inspectors. The fundamental idea is to convince the inspectors of the importance of their jobs and to encourage them to do their best by setting certain reasonable standards of performance. This keeps alive a desirable and interesting spirit of rivalry to obtain the best records, the same spirit which impels a man to strive for excellence in any line of work or sport.

RATING OF VARIOUS EMPLOYEES FOR FIRST THREE MONTHS OF 1923 ON BASIS OF BOGIES SHOWN IN FIG. 1

	Per Cent Rating		
	March	April	May
General inspector	58	100	100
Motor Inspector	62½	100	100
Controller man	23	62	42
Carpenter	50	100	100
Motor oiler	70	66⅔	100
Truck workers, Team 1	100	100	100
Truck workers, Team 2	100	100	100
Brakeman	100	100	100
Night shed	80	77	100

In the Nashville carhouse the day work is subdivided among a motor inspector, a controller man, two carpenters, a motor oiler, four truck workers and a brakeman. A general inspector supervises the work. At night a small force inspects all parts of the car.

As a basis for the competition a standard or bogey was set for each man or team of two men. This was done by studying the records of pull-ins and their causes. The standards were set in conference with the inspectors and were agreed to by them as reasonable. The records indicated that ten pull-ins per month due to faults in general inspection is entirely creditable, hence it was decided that the general inspector would be rated as 100 per cent efficient if he had this number or less. The corresponding allowances for the other men are shown in the accompanying chart, which is a sample of those which are posted on the carhouse bulletin board and revised from day to day. The pull-ins, of course, are only those chargeable to inspection, as it would not be fair to rate a man on failures over which he has no control.

Interest centers in the chart reproduced in Fig. 1. The graphical record furnishes an excellent check on the whole pull-in situation. The ratings of the men for three months are shown for comparison in an accompanying table. Another bulletin shows a month's record of pull-ins, subdivided into those chargeable to the carhouse and those chargeable to other departments. Listed also are trifling defects which are not charged to any department. In fact, many of these latter do not involve actually bringing a car into the house. It is the custom on this property to send out a man in a light motor truck to repair minor defects on cars at

COMPARISON OF CAR CHANGES, 1920 AND 1922

1920	Number of Changes	1922	Number of Changes
January	*	January	273
February	953	February	212
March	927	March	243
April	780	April	255
May	625	May	257
June	697	June	219
July	626	July	199
August	*	August	172
September	1,050	September	135
October	901	October	140
November	741	November	150
December	553	December	202
Total	7,853	Total	2,457
Average per day	25.8	Average per day	6.4

*No records available for January and August, 1920.

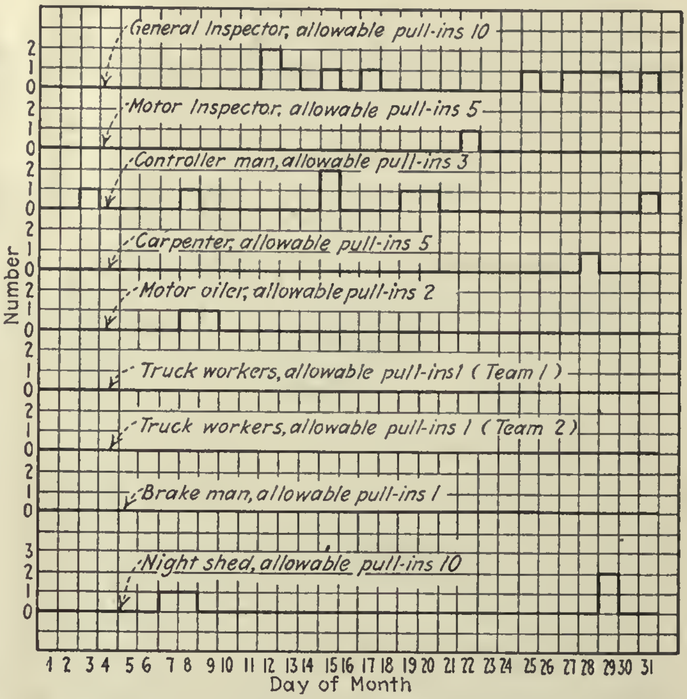


Fig. 1—Daily Pull-In Records for May, 1923, Showing Defects Chargeable to the Several Carhouse Employees

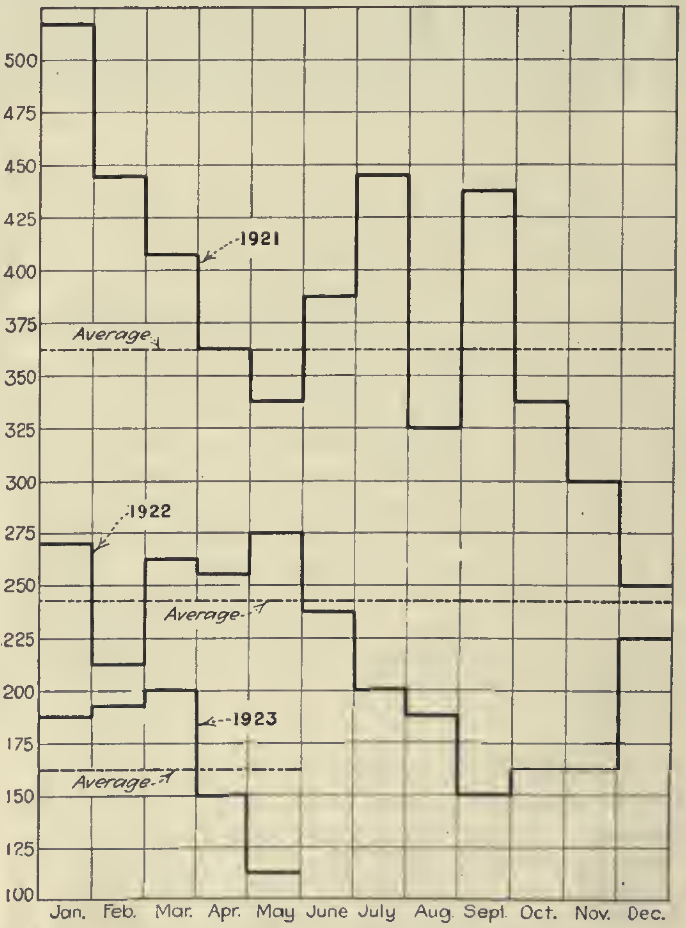
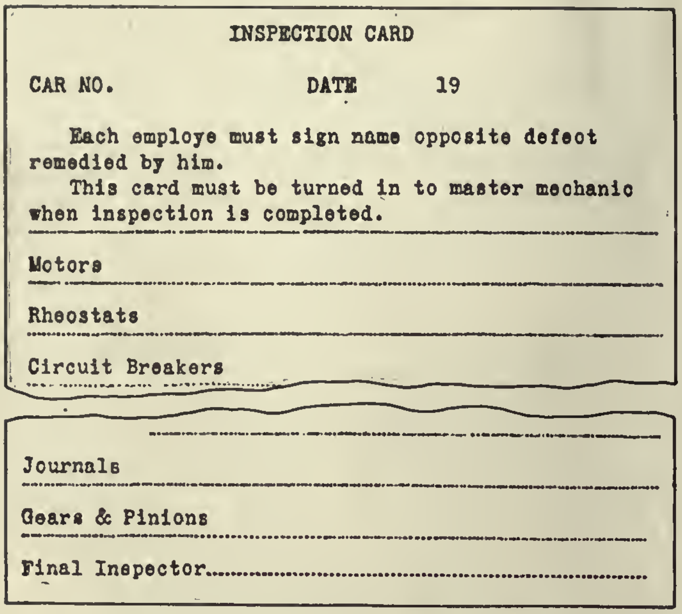


Fig. 2—This Chart Indicates How Pull-Ins Are Being Brought Under Control in Nashville

terminals or other points. Less time is required for making the repair, in many cases, than if cars were exchanged by the crew, involving movement to and from the carhouse, reading registers, etc.



INSPECTION CARD

CAR NO. DATE 19

Each employe must sign name opposite defect remedied by him.

This card must be turned in to master mechanic when inspection is completed.

Motors

Rheostats

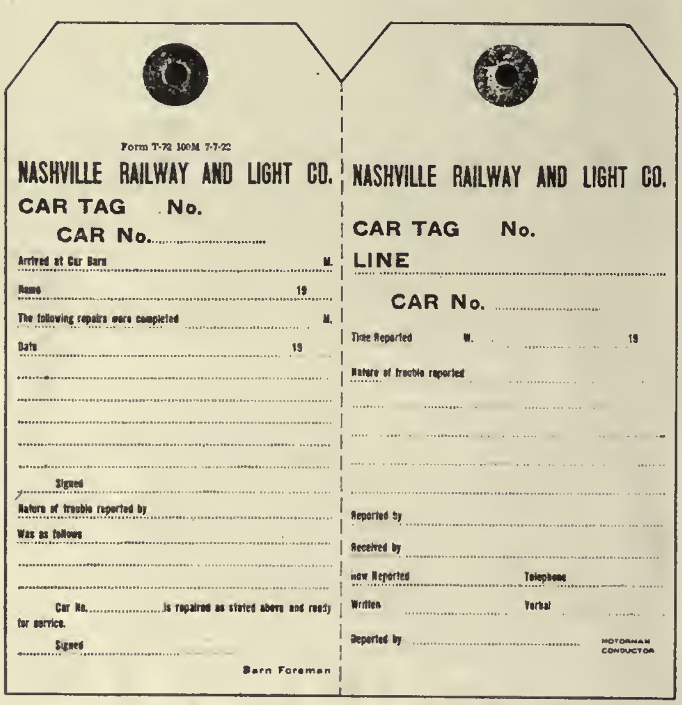
Circuit Breakers

Journals

Gears & Pinions

Final Inspector

Fig. 3—Inspection Card Used at Nashville (4½ x 11 In.)



Form T-72 100M 7-7-22

NASHVILLE RAILWAY AND LIGHT CO.

CAR TAG No.

CAR No.

Arrived at Car Barn M.

Name 19

The following repairs were completed M.

Date 19

Signed

Nature of trouble reported by

Was as follows

Car No. is repaired as stated above and ready for service.

Signed

Barn Foreman

NASHVILLE RAILWAY AND LIGHT CO.

CAR TAG No.

LINE

CAR No.

Time Reported M. 19

Nature of trouble reported

Reported by

Received by

How Reported Telephone

Written Verbal

Reported by MOTORMAN CONDUCTOR

Fig. 4—Car Tags Used in Connection with Inspection Work

Fig. 2 is a chart of monthly averages of pull-ins covering several years, which illustrates the remarkable way in which the pull-ins have been brought under control. Constantly before the men, it furnishes an extra stimulus to endeavor. It is reproduced here principally to show the results of systematic attention to inspection and light overhaul. In a report recently prepared by H. A. Davis, superintendent of railway, the statement was made that in 1922 the total number of car changes was 2,457, or 6.4 per day. He compared this with the record for only ten months of 1920, which was a total of 7,853 car changes, or 25.8 per day. The detailed comparison is given in the accompanying table.

On this property the cars are inspected on a mileage basis, the older cars being inspected every 600 miles, later cars every 800 miles and the most up-to-date cars every 1,000 miles. Figs. 3 and 4 show forms used regularly in connection with the inspection work.

Treated Lignite Has Qualities of Anthracite

CONSTRUCTION of an oven that turns lignite into a substance with similar heating properties to anthracite coal has resulted from experiments conducted by the Bureau of Mines. As a result of the discovery lignite char should be available in the Northwest in hard-coal famines that may occur in the future.

Of the nation's coal resources, it is estimated that nearly one-third is lignite. Of this the greater part is in North and South Dakota and Montana, a territory with a rigorous winter climate, and which annually imports large tonnages of anthracite and bituminous coal with an average railway haul of 1,000 miles. Lignite takes fire quickly from spontaneous combustion, so that its safe storage in even small quantities is exceedingly difficult. It does not "coke," in the sense that bituminous coal cokes, but rather crumbles when being carbonized or when thrown into the fire, and this gives rise to difficulties in firing and substantial loss, as unburned fuel, through the grate bars.

As a result of the experimental work of the Bureau of Mines, a carbonizing oven, which has every indication of being a practical, commercial oven, was designed, constructed, and operated. Quantities of the oven's product, known as lignite char, were later tested and found to possess heating properties very similar to those of anthracite coal. Experiments have been conducted also looking toward the development of suitable grates for the utilization of lignite char.

CARHOUSE PULL-IN REPORT FOR MAY, 1923, NASHVILLE RAILWAY & LIGHT COMPANY

Pull-ins Chargeable to Carhouse

Defect	Failures
Air	8
Air governor	3
Brakes adjusted	3
Brake rods broke	2
Controllers	7
Rheostats	7
Circuit breakers	2
Motors (miscellaneous)	1
Armature bearings	3
Brush-holders	2
Motor wires	10
Trolleys	2
Car wiring	4
Fenders	1
Total	55

Pull-ins Not Chargeable to Carhouse

Defect	Failures
Armatures grounded	17
Armatures flat commutator	1
Armature cord	1
Armature wire	1
Armature broken connection	2
Fields grounded	8
Field wires off in case	5
Air motor armatures grounded	3
Safety type air failures	2
Rheostat broken in accident	1
Broken axles	2
Fenders broken by obstructions on track	1
Derailments	5
Struck by automobile	2
Split switch	2
Struck by lightning	1
Journal box burst	1
Found O.K.	1
Total	56

Defects Repaired Without Charge

Air fuses blown	2
Air brushes reported	2
Brakes (Sylvan Park)	1
Controller fingers	2
Motor (miscellaneous) port lids	2
Motor wire taped	1
Call bells	1
Trolley oiled	1
Trolleys replaced	2
Journals oiled	3
Derailment	5
Roof leaking	1
Total	23
Total pull-ins	111
Average per day	3.5
Chargeable to carhouse	55
Average per day	1.7

(*Signed*) J. J. CONNORS.

Door Lock for Side-Entrance Cars

Hudson & Manhattan Railroad, After Trial Use on Twenty-five Cars, Is Installing on All Doors Air-Operated Locks of a New Type Together with Indicators Which Show the Door Positions by Means of Colored Lights

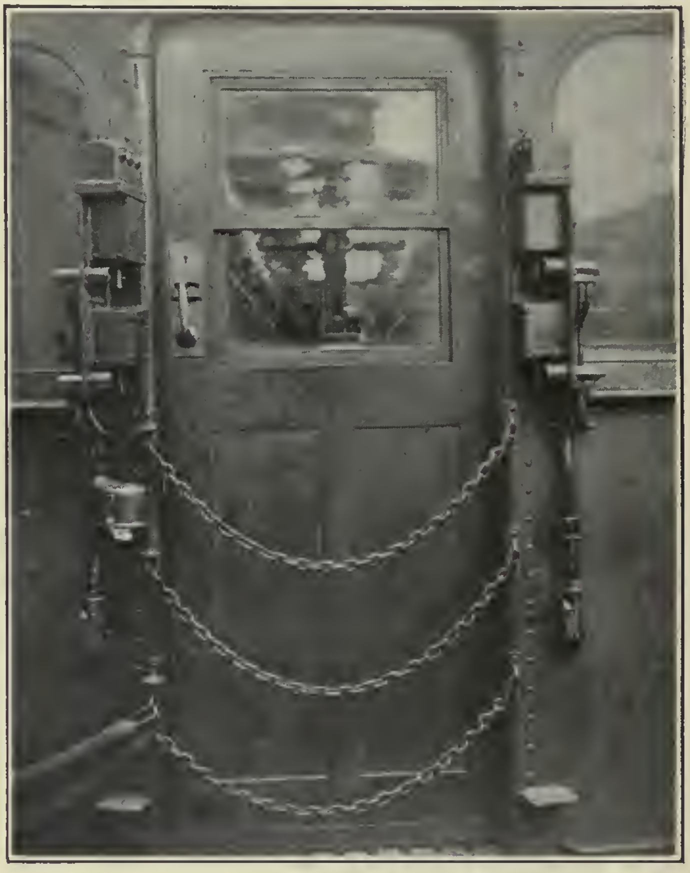
A DEVICE by which the doors of a center- and end-entrance car are automatically locked in the closed position while the car is in motion, but can be released for opening when the car reaches a station, has been worked out for the cars of the Hudson & Manhattan Railroad. In fact, it has been in use on twenty-five cars of that system for about a year, with such satisfactory results that all of the cars are being equipped with the system. Signal lights at the end of each car show to the train guard whether the doors which he controls are closed and locked or not, a red light indicating that they are not locked, and a green light that they are locked. At the same time a light signal in the motorman's cab shows the motorman when all train doors are locked, and, in consequence, whether he can proceed or not. The device is used in connection with pneumatic door-operating mechanisms of the National Pneumatic Company, with which the doors of the Hudson & Manhattan are equipped, and the new door lock will be placed on the market by the National Pneumatic Company.

To understand the operation of the system it should be understood that on the Hudson & Manhattan Railroad there is a train guard between each pair of cars. The trainman between the last two cars of a train operates the end-side doors adjacent to his position and the center-side doors of the rear and next to the rear cars. All other trainmen operate the end-side doors adjacent to their position and the side-center door of the forward car to their position. On each side of the vestibule at each end of each car are two electric switches which control the valves of the door engines on the side of the car on which they are located. The upper switch operates the end-side door and the lower switch the center-side door, although by multiple-circuit arrangement the center-side door is so connected up that that door can be opened from either end of the car, depending upon the direction the car is traveling and which trainman is to operate it.

SIGNALS SHOW POSITION OF DOOR LOCK TO TRAIN GUARD

The new door lock is operated by a pneumatic push button, whose position is adjoining the electric door switch, as shown in the illustration of the switch box. Above the switch box are signal lights indicating to the trainman whether the doors under his control are closed and locked. They consist of three lights, red, yellow and green. Of these, red is used for "open door" and green for "locked door" on all cars in the train except the first one, which, for reasons which will be set forth later, uses red and yellow as the significant colors.

A diagram of the air and electric connections of the door-operating and lock mechanism on the car is presented herewith. In this drawing the standard door operating mechanism wiring is shown on the outside and the additional connections for the lock and signal mechanism on the inside of the chart. The heavy lines show the storage-battery feeds used with the door-operating mechanism and the light lines the control lines.

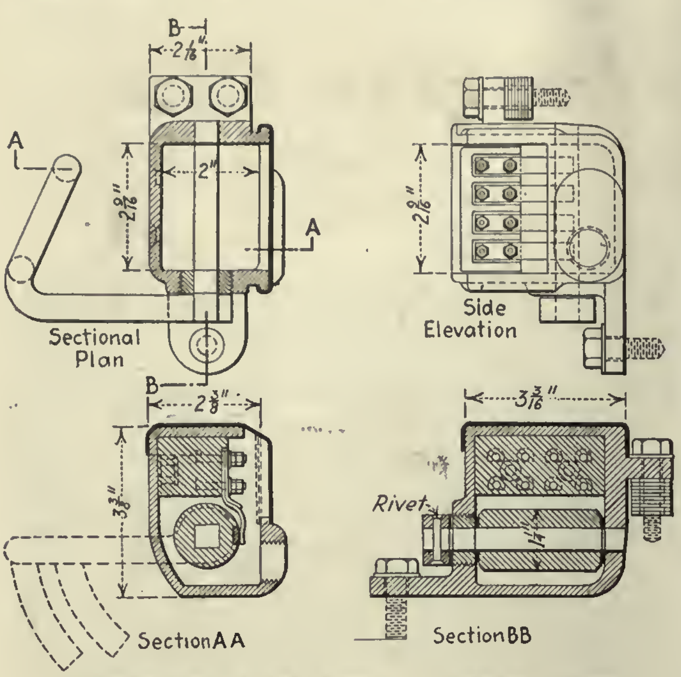


End of Car Showing Signal Box and Locking Push Button

An examination of this chart will show that the lock push button for the center door can be operated from either end of the car. Pressure on the push button admits air to the plunger marked in the diagram, "piston operating lock." If one center-door push button is used, the other end push button is blocked by a ball check at the center door, which, as shown in the chart, admits air from the left-hand push button and not from the right-hand one. To release the lock, a push movement is required, and to open the door mechanism a pull of the switch. This makes it impossible for a person falling or pressing against either or both control mechanisms to open the door. To close the door, no manipulation of the lock push button is necessary, the lock automatically snapping into place as the door takes the closed position. This gives unhampered control to the trainman through the mechanism operating switch shown for quick control of the door, that is to say, it may be reversed to prevent the door striking passengers rushing through the entrance when the door is closing.

To follow the action from this point, it is necessary to refer now to the door lock actuated by the piston operating lock, when the pneumatic push button is operated. This is shown in the smaller drawing on page 449. It consists essentially of a hinged catch, with a roller on the end, as shown as 1, which normally holds the door closed.

When air is admitted to the cylinder 2 the piston



Horizontal and Vertical Sections of Drawbar Switch

raises the locking lever 3, which permits the catch to be pushed back by the opening door. When the door is closed by the door-control switch, the catch automatically slips behind it, holding it fast.

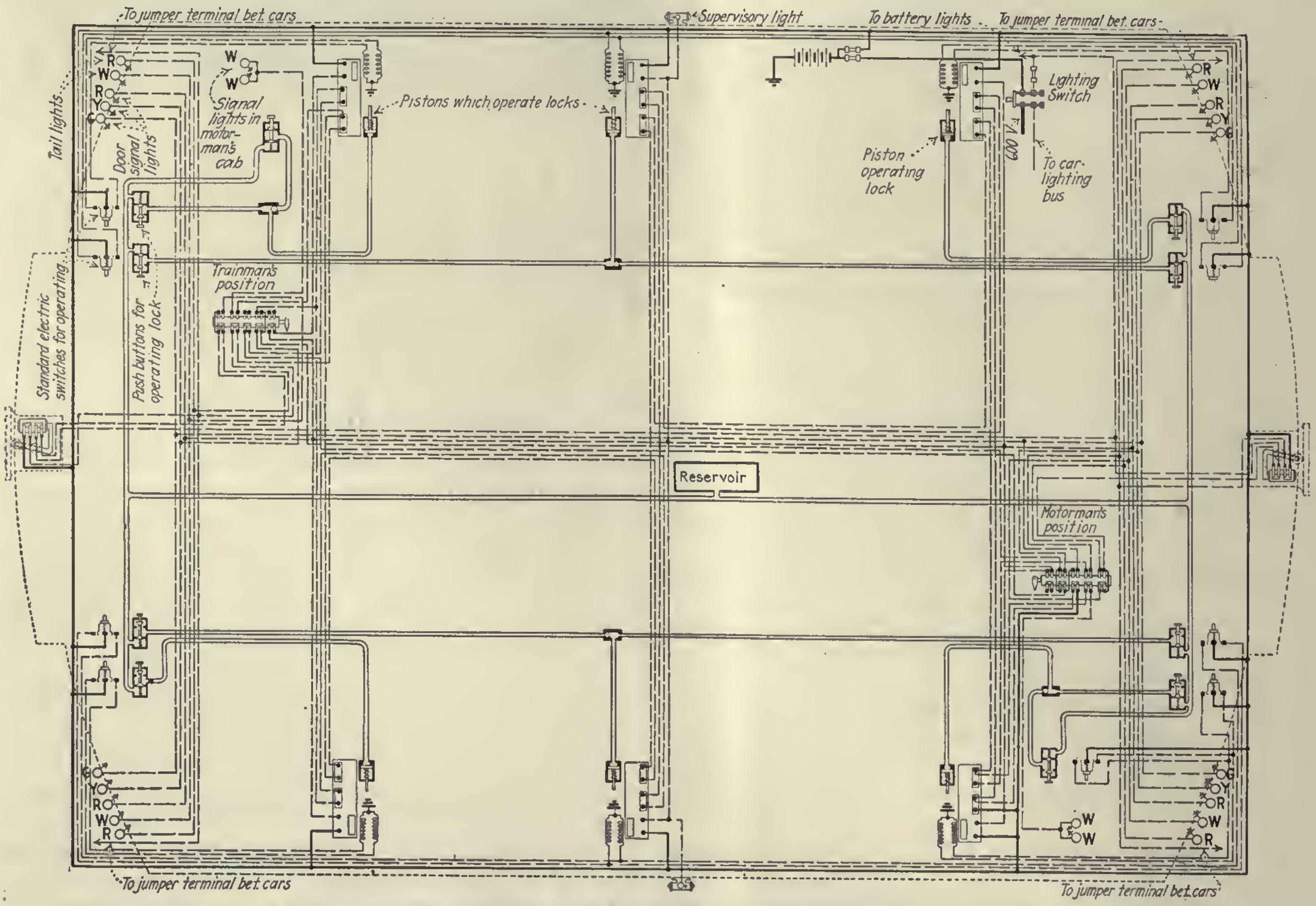
To operate the signal lights and so inform the trainman whether the doors controlled by him are locked or not, the locking lever 3 carries at its outer end a Bakelite contact-making device. By this device, when the lever is at its upper position or when the door catch is out, the contact for the green light is made, and when the lever is at its lower position, corresponding to an open door, the contact for the red light is made.

DIFFERENT ARRANGEMENT IS USED FOR FIRST CAR

The system as described is for all cars except the front car of the train. Here a distinctively different arrangement is desirable because the front right-hand door of the front car forms part of the motorman's cab and often has to be opened part way or entirely for the convenience of the motorman. Hence, by means of the drum switch shown, this door can be cut out of the circuit, but when it is so cut out, the yellow lamp trainman's signal circuit is cut in instead of the green. In this way, the trainmen are obliged to distinguish as regards signals from the first car of the train and the other cars, and the instructions are that all trainmen are to proceed only on green signal except the conductor on the forward car, who shall proceed on yellow signal only.

SIGNALS TO MOTORMAN

In addition to the signal lights described, another independent circuit indicates to the motorman when all doors in the train are locked. Electric marker lights at each end of the train are cut in or out by the drawbar switch, shown in the wiring diagram. This drawbar switch is located on top of the drawbar and has a projecting pivoted arm so arranged that the switch cannot be closed when the drawbar to which it is attached is coupled. But at each end of the train, where there is an uncoupled drawbar condition, the switch will close, thereby feeding energy to the electric tail lamps, also energy from the rear end of the train through all doors


To jumper terminal bet. cars
Supervisory light
To battery lights
To jumper terminal bet. cars
R
W
R
Y
G
W
W
Signal lights in motorman's cab
Door signal lights
Tail lights
Pistons which operate locks
Lighting Switch
600 V.
Piston operating lock
To car-lighting bus
R
W
R
G
Trainman's position
Standard electric switches for operating
Push buttons for operating lock
Reservoir
Motorman's position
G
Y
R
W
R
G
Y
R
W
R
W
W
To jumper terminal bet. cars
To jumper terminal bet. cars

Wiring Diagram for Pneumatic Control of Car-Door Lock and Electrical Controls of Door Operation, Lock and Door Signal Indications. Motorman's Indication and Tail-Light Aspects in series connection to the motorman's cab indication circuit.

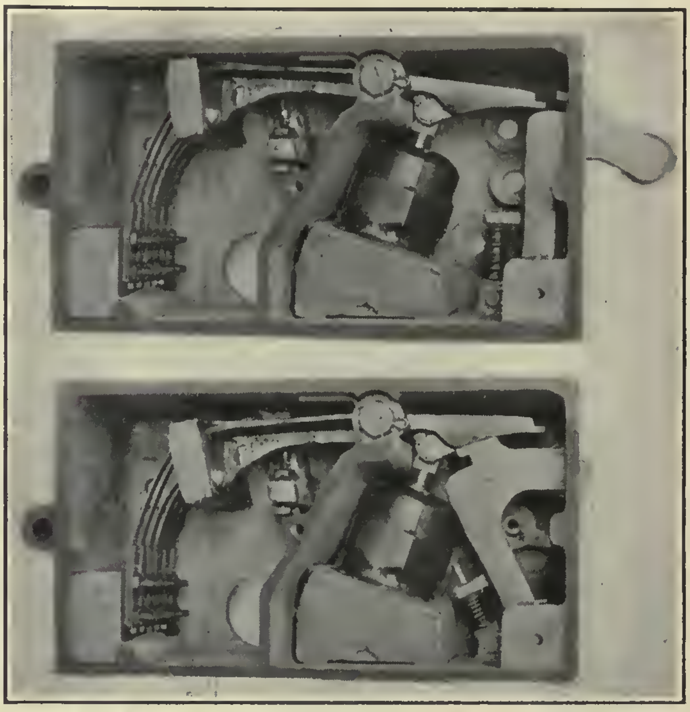
This drawbar connection is shown in detail in the small drawing on page 448. The pivoted arm making the connection has two curved fingers which slide into the drawbar pinholes when there are no coupling pins in place, but these fingers cannot do so if there is a coupling pin in the drawbar. The hub of this contact arm has a drum switch by which the electrical connections are made.

DRUM SWITCHES AND PLATFORM GUARD SIGNALS

Reference has been made to the drum switches shown in the large diagram, marked in one case "trainman's position" and in the other case "motorman's position." There is a switch of this kind located at each end of each car. All switches in the train are set at trainman's position except the one adjacent to the motorman's cab, which is set at motorman's position.

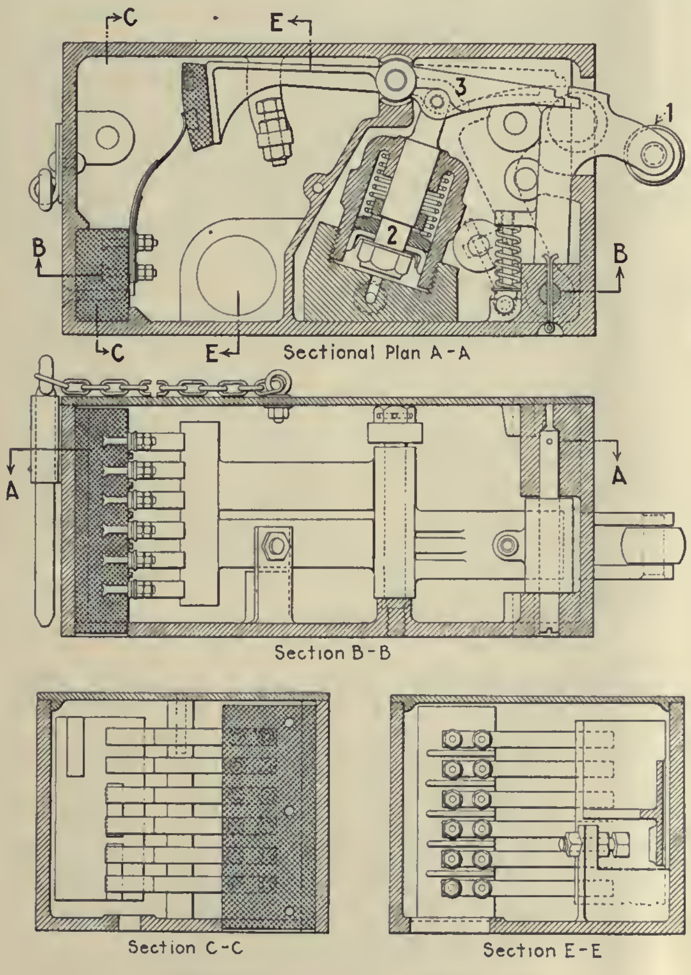
The entire selection of the trainman's indication, motorman's cab indication, red markers to the rear end and white markers to the forward end of the train is through these drum switches, and all circuits are so arranged that should either a trainman or motorman fail to set his switches in the proper position, no green or clear signal indication will be received at his position by a trainman or by the motorman in his cab.

The motorman's lights, marked *WW*, consist of two lamps in multiple, for safety in case one should burn out, and are connected only when the drum switch is in "motorman's position." These lights burn only when all doors of the train are closed and locked.



Looking Down on the Locking Device. At Top, in Locked Position; at Bottom, in Unlocked Position

In addition to the circuits already described, there is a circuit on each car connecting with what is known as a "supervisory light," shown in the upper center of the large diagram. This lamp is on the outside of the car, alongside the center door, and lights up only when the doors of that car are open. The purpose of this light is to enable the platform men easily to determine which doors of a train are not closed, when it is time for a train to start. They can then see which trainman is having difficulty in getting his doors closed, either because of the door sticking, slowly-moving passengers or other causes. If necessary, he can then hasten to that point to correct the trouble.



Plan and Sections of Locking Device

MECHANICAL DATA

The case housing the vestibule signals, the door switch and the door lock switch measures 22 in. high by 6 in. wide by 7 in. deep; that is to say, it is but slightly larger than the former case holding the door switch only. The lights and sockets throughout are standard automobile equipment, so that no special equipment is required in these particulars.

Improvement in Transit Conditions Is Urged

THE Georgia Railway & Power Company is giving a good deal of attention in its car card and other advertising to traffic problems. Here are the way some of the recent posters read:

"Obey the traffic laws, park right, signal right, drive right, walk right and remember the other fellow's rights."

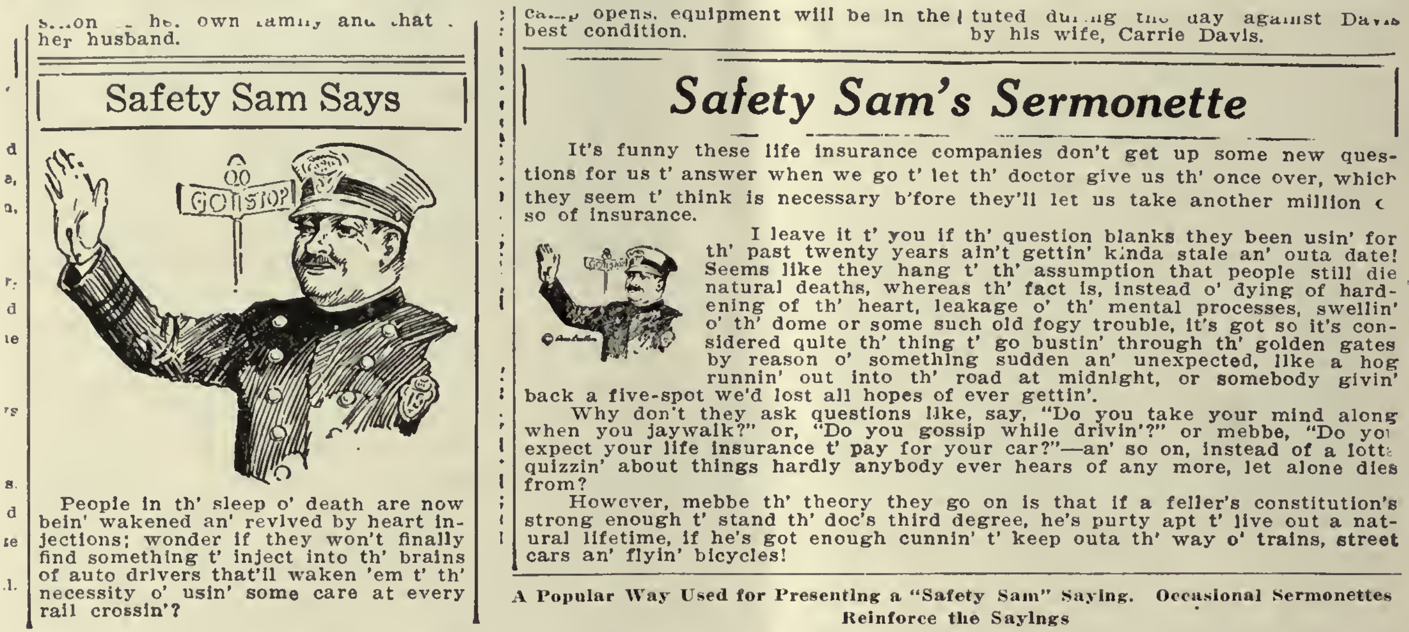
"Obey the traffic laws. Be sure you are allowed to park and then see that both right-hand wheels are against the curb."

"You are on the jury. The solution of Atlanta's transportation problem, present and future, is now in the hands of a jury consisting of the City Council and the public. You are invited to study it impartially and reach a verdict solely in the public interest. Let's solve Atlanta's transportation problem now."

How "Safety Sam" Reduced Accidents

Union Traction Company of Indiana Has Original Plan for Conducting Safety Work—Not a Fatal Accident to a Passenger in Over Four Years

SAFETY activities on the Union Traction Company of Indiana center in the office of the safety engineer, Ross E. Luellen. For publicity purposes he is known locally as "Safety Sam," impersonating a good-natured traffic officer with a vein of homely humor and a desire to reduce accidents. Safety Sam supplies copyrighted material to sixteen newspapers published in localities on the I.U.T. system, and also to other papers in different parts of the country. This material, supplied weekly, comprises a weekly sermonette and a "Safety Sam Says" item for each weekday. A cut of Safety Sam is used to attract attention of the reader.



[illegible] own [illegible] and [illegible]hat [illegible] her husband.

Safety Sam Says

People in th' sleep o' death are now bein' wakened an' revived by heart injections; wonder if they won't finally find something t' inject into th' brains of auto drivers that'll waken 'em t' th' necessity o' usin' some care at every rail crossin'?

Ca[illegible] opens, equipment will be in the best condition.

[illegible]tuted during the day against Da[illegible] by his wife, Carrie Davis.

Safety Sam's Sermonette

It's funny these life insurance companies don't get up some new questions for us t' answer when we go t' let th' doctor give us th' once over, which they seem t' think is necessary b'fore they'll let us take another million or so of insurance.

I leave it t' you if th' question blanks they been usin' for th' past twenty years ain't gettin' kinda stale an' outa date! Seems like they hang t' th' assumption that people still die natural deaths, whereas th' fact is, instead o' dying of hardening of th' heart, leakage o' th' mental processes, swellin' o' th' dome or some such old fogy trouble, it's got so it's considered quite th' thing t' go bustin' through th' golden gates by reason o' something sudden an' unexpected, like a hog runnin' out into th' road at midnight, or somebody givin' back a five-spot we'd lost all hopes of ever gettin'.

Why don't they ask questions like, say, "Do you take your mind along when you jaywalk?" or, "Do you gossip while drivin'?" or mebbe, "Do you expect your life insurance t' pay for your car?"—an' so on, instead of a lotta quizzin' about things hardly anybody ever hears of any more, let alone dies from?

However, mebbe th' theory they go on is that if a feller's constitution's strong enough t' stand th' doc's third degree, he's purty apt t' live out a natural lifetime, if he's got enough cunnin' t' keep outa th' way o' trains, street cars an' flyin' bicycles!

A Popular Way Used for Presenting a "Safety Sam" Saying. Occasional Sermonettes Reinforce the Sayings

This plan has been in use for a considerable time, and the general familiarity of the I.U.T. patrons with the traffic officer and his sayings furnishes a background for talks which the safety engineer delivers on request before local Kiwanis and Rotary Clubs, schools and other civic organizations. In such talks, which are of a semi-humorous nature, the safety message is delivered in such form that the local papers publish reports in considerable detail. A daily circulation of 100,000 or more thus is secured for the messages of Safety Sam in the territory of the I.U.T. without cost for newspaper space.

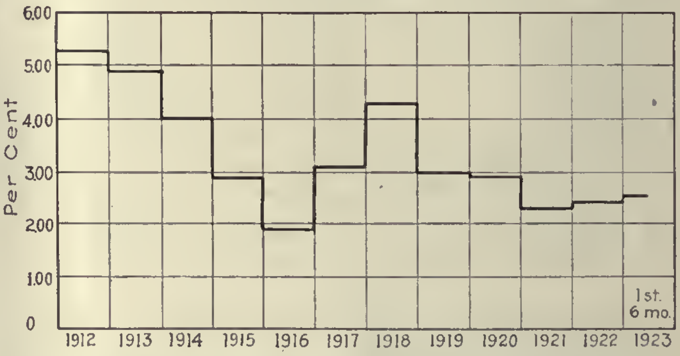
In addition to the Safety Sam activities, the safety idea is promulgated by means of posters, blotters, advertisements in the company's time-tables, and a monthly publication, the *Union Traction Safety Magazine.*

The magazine, which is edited by the safety engineer, is now in its ninth volume. It is a medium of exchange for information about employees, and of course keeps them posted on accident records. These are summarized monthly, the data for the five interurbans and the four city terminals being segregated. Car-miles, number of accidents and car-miles per accident for the current and preceding months are tabulated.

While the field of the safety engineer primarily is to deal with the public in the safety work, he has certain responsibilities in assisting the department heads in their safety work with the employees. He also organizes all general activities of a safety character. One of these is a semi-annual banquet tendered by the company to all members of the safety committee. These banquets are regularly attended by high state officials and other public men who appreciate the opportunity thus to come in touch with representative electric railway employees.

The safety committees date back to 1912, when one was appointed at each of the five interurban terminals, and a general safety board, consisting of the heads of departments, was formed. These committees handled all safety work until 1920, when Mr. Luellen, formerly a claim agent of the company, was appointed safety engineer. Under his leadership the safety committees were continued, but the administration of the work was put in the hands of one man appointed safety agent at each terminal, whose duties are to receive suggestions from committee members and see that they receive appropriate attention.

The safety engineer acts as secretary of the general safety board, which meets monthly to consider plans for furthering safety on the property. He also works directly with individual employees who give suggestions, and discusses safety with groups of employees, emphasizing the value of carefulness, thoughtfulness and foresight in doing their work.

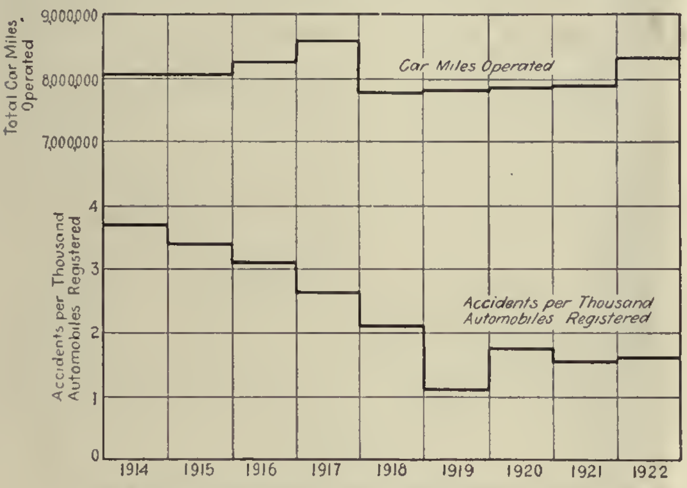


How the Vehicle Collisions Have Been Reduced Relative to the Vehicle Registration

New men, after having been tried out as students and passing the usual tests for employment, undergo a written examination in the claims department as to what they would do if accidents of various types should occur. Following this, the new men have a conference in a group with the claim agent, who explains mistakes in the answers given, and gives a general talk on accident prevention methods. The safety engineer then gives a talk also intended to foster sane thinking on accident prevention.

ACCIDENTS HAVE BEEN REDUCED MATERIALLY

One result of the consistent safety program is that during the past four years and three months not one of the 70,000,000 passengers has been killed. The accident records have been growing better consistently. The best division record for the current year is that of interurban crews of the Muncie terminal, who had, during one recent month, but three accidents in 132,000 miles of operation, corresponding to 44,000 miles per accident. This is the more noteworthy since the streets in Muncie are narrow and congested.



The Redaction in Proportion of Gross Spent for Accidents Has Been Obtained Over a Period of Years

Automobile accidents are decreasing comparatively, as is shown by an accompanying chart. While the car-miles operated have not fluctuated greatly in the past nine years, the accidents per 1,000 automobiles registered in Indiana had been reduced by 1922 to less than half what they were in 1914.

The real test is in the cost of accidents. The graph shows the per cent of gross earnings charged to the legal and claims department, settlements and damages. It has gone down from 5.3 per cent of gross in 1912 to 2.5 per cent for the first half of the current year.

The company's proficiency in accident prevention was recognized in 1916 by the award to it of the Anthony N. Brady medal.* Since the award of the medal, the safety work has been pushed aggressively, although it has been somewhat simplified from the original plan and has been developed in those directions found most effective. As H. A. Nicholl, general manager of the company, puts it, a "working plan without frills" has been evolved.

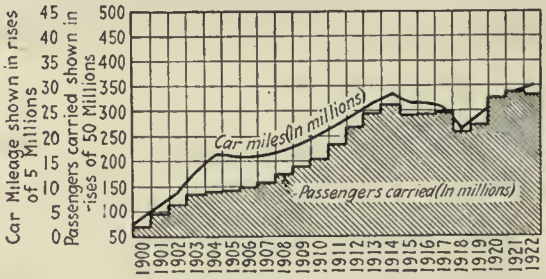
Graphs from Australia

THROUGH the courtesy of E. J. Doran, traffic manager New South Wales Government Tramways, some recent statistics in graphical form of the tramways, city and suburban electric lines are available for publication. They may be considered as supplementary to the article on the Sydney City System, published in the issue of this paper for Jan. 13, 1923.

The first diagram shows the passengers carried each year over all tramway lines (steam and electric) from 1900 to 1922. The light line indicates the car mileage during that period, and the solid area the number of passengers.

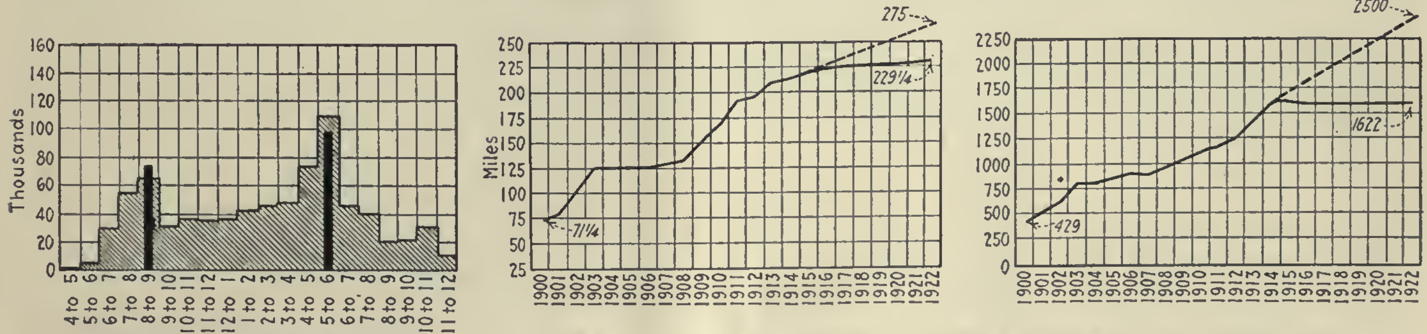
The second shows the load curve for all lines on an average week day, the light area indicating the passengers (in thousands), and the black line the number of seats during the two peak hours of from 8 to 9 a.m. and from 5 to 6 p.m. It will be seen the seats are more numerous than the passengers during the morning rush hour, but there is a slight excess of passengers over seats during the evening rush hour.

The third chart shows the length of track (all lines) measured as route-miles open for traffic, from 1900 to 1922. As will be noticed the line starts at 71¼ miles in 1900 and finishes at 229¼ miles in 1922. The dotted line was drawn to indicate the rate of progress at the beginning of the war. If this rate had continued since 1914 as for the previous ten-year period, the route-miles would have been 275. The next chart shows similar figures for number of cars owned. The cars in 1922 numbered 1,622, whereas if the pre-war rate had been continued, the number would have been increased to 2,500.



Passengers Carried and Car-Miles, Sydney System

In all of these charts showing growth since 1900 the effect of the war in stunting the development of the system is quite marked.



Australian Statistics—At Left, Passengers and Seats. In Center, Roate-Miles. At Right, Passenger Cars, Sydney System

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*See issues of this paper for Jan. 22, 1916, page 169; Feb. 5, page 273, and Feb. 12, page 315.

Weekly Pass Successful in Fort Wayne

The Average Fare Has Been Reduced While the Gross Earnings Have Increased—Sales of Weekly Pass Represent 29 per Cent of Passenger Revenue

THE weekly pass, which was inaugurated on March 5, 1922, on the Fort Wayne city lines of the Indiana Service Corporation, has proved so successful in the eighteen months that it has been in operation that the company states that advertising to promote its sale has been stopped. With a cash fare of 7 cents, tokens four for 25 cents and the weekly pass for $1, 49 per cent of the revenue is derived from the sale of the tokens, 29 per cent is from the sale of passes, and 16 per cent from cash fares. Demand for the pass has been greater than was anticipated at first, mainly because it is used to great advantage by people in going to and from home for the noon lunch period.

Latest Type City Car in Fort Wayne

The weekly earnings in Fort Wayne for the first week in February, 1923, were $3,816.72 greater than for the corresponding week of 1922, although on Feb. 1, 1922, before the advent of the weekly pass, the average fare was 6.31 cents, while on Feb. 1, 1923, the average rate of fare had dropped to 5.37 cents. An increase in revenue passengers for a representative week in April, 1923, over the corresponding week in 1922 was 25 per cent, while the increase in passes sold during this period amounted to 92 per cent. This was accomplished with only 10 per cent greater car mileage.

EARNINGS BY WEEKS—FORT WAYNE CITY LINE

1922		1923			
Week Ending	Gross Receipts	Week Ending	Gross Receipts	Increases	Passes Sold
Jan. 8	$18,302.66	Jan. 7	$21,819.55	$3,516.85	5,705
Jan. 15	18,887.67	Jan. 14	23,293.32	4,405.65	6,806
Jan. 22	19,640.82	Jan. 21	22,660.74	3,019.92	7,003
Jan. 29	20,764.32	Jan. 28	22,674.00	1,909.68	6,790
Feb. 5	19,085.27	Feb. 4	22,125.78	3,040.51	6,929
Feb. 12	18,841.15	Feb. 11	22,901.99	4,060.84	7,207
Feb. 19	19,240.87	Feb. 18	23,446.21	4,205.34	7,161
Feb. 26	19,353.18	Feb. 25	22,781.64	3,428.46	7,542
Mar. 5	18,902.49	Mar. 4	23,194.77	4,292.28	7,524
Mar. 12	18,326.01	Mar. 11	24,017.60	5,691.59	7,307
Mar. 19	17,875.46	Mar. 18	23,745.91	5,870.45	7,467
Mar. 26	18,634.96	Mar. 25	23,341.47	4,706.51	7,605
Apr. 2	18,651.00	Apr. 1	23,261.05	4,610.05	7,399
Apr. 9	17,269.53	Apr. 8	21,814.15	4,544.62	6,570
Apr. 16	18,769.20	Apr. 15	22,012.52	3,243.32	6,899
Apr. 23	17,459.24	Apr. 22	22,105.07	4,645.83	6,871
Apr. 30	17,406.62	Apr. 29	20,974.27	3.567.65	6,526
May 7	17,026.11	May 6	20,374.74	3,348.63	6,311
May 14	17,280.48	May 13	21,422.97	4,142.49	6,263
May 21	17,265.63	May 20	20,475.25	3,209.62	6,267
May 28	17,285.03	May 27	20,455.42	3,170.39	6,178
June 4	16,906.74	June 3	20,008.47	3,101.73	5,670
June 11	17,804.84	June 10	20,173.86	2,369.02	5,994
June 18	17,019.82	June 17	20,265.99	3,246.17	5,957
June 25	16,839.76	June 24	19,880.90	3,041.14	5,753
July 2	16,276.82	July 1	19,541.82	3,265.00	5,817
July 9	15,563.88	July 8	18,162.12	2,598.24	5,136
July 16	16,370.77	July 15	19,163.66	2,792.89	5,500
July 23	15,859.90	Julv 22	18,703.24	2,843.34	5,534
July 30	16,217.87	July 29	18,697.61	2,479.74	5,567
Aug. 6	16,211.66	Aug. 5	18,925.82	2,714.16	5,575
Aug. 13	17,353.11	Aug. 12	18,497.17	1,144.06	5,411
Aug. 20	16,286.90	Aug. 19	18,777.83	2,490.93	5,466
Aug. 27	15,973.48	Aug. 26	18,824.48	2,851.00	5,415
Sept. 3	15,935.70	Sept. 3	18,331.91	2,396.21	5,350

More than 7,000 passes have been sold in a single week. By means of counters on the cars, it has been found that each pass is used on an average of twenty-five times a week. Fare collection is made with the aid of the Cleveland fare box. No register is used in the car either for recording tokens, cash fare, passes, or transfers received by the operator. The management feels that the use of a register and the subsequent recording and accounting of such data would be merely a waste of time. The number of revenue passengers is calculated from the cash and token receipts for the week. An analysis of these figures discloses that the decrease in cash and token passengers due to the pass for one year averaged 15 per cent, although the weekly revenue increased during this period on an average of 21 per cent.

Actual earnings for the thirty-five weeks of 1923 compared with a corresponding period in 1922 are shown in the accompanying table. The company operates about 60,000 car-miles a week, and as a result of the frequent service and low fare there has been no bus competition in Fort Wayne.

New Single-Phase Motor Car for Maritime Alps

IN A RECENT issue of *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles*, Jacques Schopser, head of the rolling stock department of the tramway company of Nice and the Littoral, describes a type of single-phase motor car which will be used on the departmental tramway line taken over by the Compagnie des Chemins de Fer du Sud.

This car takes single-phase power at 6,600 volts, 25 cycles, from the overhead contact line, and the pressure is stepped down by means of a transformer to from 165 to 365 volts for the motors, 86 volts for the compressors and 110 volts for lighting and heating.

The weight of the car empty is 28½ tons, and it is equipped with four motors rated at 75 hp. each on the one-hour basis when supplied with 330 volts. Under these conditions the motor draws 230 amp. and makes 800 r.p.m. It is geared to the axles at a ratio of 113:18, or 6.28. The motors are of the series-compensating type, with six poles. Resistance leads are used in the armature winding.

Air for the motors is drawn from above the platform through gratings and flexible or accordeon conduits which provide for displacement of the trucks with respect to the body. The air leaves the motors through screened orifices in the ends.

The controller makes connections with the transformer taps, without contactors, and it is provided with a magnetic blowout. The car is equipped with Westinghouse air brakes, hand brakes and electromagnetic emergency brakes. The last-named are fed by a storage battery which has a capacity of 100 amp. for fifteen minutes at 12 volts. A small motor-generator set is provided to recharge the battery.

Six of these cars have now been in use more than a year with entire satisfaction. One of them can mount a grade of 6 per cent with 55 tons trailing load.

The Readers' Forum

Car Design that Appeals to the Rider

STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITY COMMISSIONERS
NEWARK, Sept. 11, 1923.

To the Editors:

I have read with much interest the article on "Operating Results of Automatic Door Safety Cars" which appeared in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 25, 1923. It was with equal interest that I read your editorial comment on this subject in the issue of Sept. 8, 1923.

When the one-man safety car first made its appearance, to me at least, an obvious objection to its design was the provision of but a single door for entrance and exit, with the resulting loss of time and not a little inconvenience to passengers, particularly at points of heavy interchange, and more especially during inclement weather. A subsequent careful study and observation of the operation of these cars and of many other types of one-man cars, both large and small, safety and otherwise, but all equipped with single doors, has demonstrated this fact to my satisfaction.

The adoption of the double door for one-man (not safety) cars by certain well-known properties was a step in the right direction, and when the Chicago Surface Lines announced about two years ago the development of a car equipped with double doors, the exit door being automatically operated, it seemed that an obstacle to successful one-man car operation had been overcome. The subsequent construction and operation of a number of these cars appears to have resulted in demonstrating their great superiority over the older types, at least in the matter of rapidity of passenger interchange, and has thus advanced the one-man car much nearer the point of development where it may be used efficiently for mass transportation.

The psychology of this improvement is, to the mind of the writer, quite as great a point as the actually decreased time of passenger interchange. The annoying delay of intending passengers waiting for alighting passengers to leave the car has been entirely eliminated. This is something that the patron sees, experiences and consequently appreciates.

It appears to the writer that, particularly in these days of competition in the transportation field, it behooves the street railway industry as a whole to awake to the fact that if competition is to be met successfully, and if public favor, the greatest asset any public utility can have, is to be gained and retained, a greater study of and consideration for the needs, comfort and convenience of the traveling public must be undertaken.

The particular improvement referred to in this letter perhaps cannot, for financial or other reasons, be adopted by all, or perhaps not even by many companies, except probably in the case of purchasing new equipment, but the principle of catering as far as possible and practicable to the public interest and welfare and in a way that the public can *see* and *appreciate* can be carried out in many and frequently comparatively inexpensive ways which will tend to cause the public to "pat the industry on the back." This, in my judgment, is what the electric railway industry is most in need of today.

H. C. EDDY, Street Railway Engineer.

Multiple-Unit Train for Key System

THESE new cars for the San Francisco-Oakland Terminal Railways may be operated either as one-man single units or in two-car trains. The cars are said to be the first to be equipped with heavy bus line contacts in the face of the car couplers. When the cars are coupled together the two air lines are connected, the control circuit connections are made and the bus lines carrying power from the trolley on the forward car to the motors on the rear car are connected all upon one impact of the two drawheads. This is accomplished by a new type of Tomlinson coupler. The cars are equipped with dead-man controllers and door interlocking devices. Low step height is one of the features. The addition of fifty-five cars of this type will greatly aid in carrying the peak loads.

Association News & Discussions

Organizing a Public Relations Department*

By Arthur V. Bland
Director of Public Relations†

PRIOR to the organization of the public relations department of the associated Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Electric Railway Company and the Lima-Toledo Railroad there was no systematized effort made along the lines of publicity or the molding of public opinion. Some idea of the limited scope of the advertising program can be gained by the realization that the total advertising budget in 1921 was but $3,550, of which nearly 50 per cent was spent for time folders and half of the remainder represented newspaper exchange advertising contracts.

The new department did not inherit anything in the way of a hostile attitude either on the part of the press or the public, hence there was no major problem in the shape of adverse sentiment to overcome. The attitude of the general public can best be described as negative, and the traction lines were treated for the most part with disdainful indifference.

The principal problem facing the department resolved itself into a matter of reawakening public interest in the tractions and an endeavor to create a more extensive market for the only product which we had to sell—transportation. I shall endeavor to present a broad general picture of the more notable accomplishments.

About the first move toward establishing better relations with the traveling public was the removal of all "don't" signs from the passenger cars and stations, such as "Don't Put Your Feet on the Seats," "Don't Spit on the Floor," "Don't Smoke." The absence of these signs and others of similar purport have been the subject of favorable comment, and as far as the deportment of our passengers goes we have found little to complain of as the result of the removal of the admonitory legends. The next move along this general line was the removal of the numbers from the trainmen's caps and uniforms and the substitution of metal strips bearing the crews' names, which are placed in holders prominently displayed on the interior bulkheads of the cars. Later, individual business cards were provided for the trainmen, cards which carried the conductor's name together with a friendly message on one side and an abridged time card of the line on the other. These cards were supplied at the trainmen's request. This idea has recently been carried a step further by providing similar cards for station agents in the larger cities.

An effective stroke of publicity was the placing of messages stressing the necessity of a more equitable distribution of highway costs, printed in foot-high letters along the sides of a number of the interurban passenger cars. These messages are believed to have exercised a potent influence in shaping the opinion of a considerable number of the rural residents in the direction of providing a more adequate tax upon these predatory users of the highways. Among the texts carried in this manner were: "Are the Highways Paid for by Those Who Use Them?" "Highway Travel Cost Includes Road Upkeep. Who Pays It?" "Do Private Automobile Taxes Help Passenger Buses?" and "Traction Travel 3 Cents per Mile—Highway Travel—?"

Prior to the last meeting of the State General Assembly the department organized a highway research bureau and assembled a mass of information bearing upon motor transportation, road costs, highway traffic rules and related subjects, all of which proved valuable during the ensuing widespread discussion of these subjects. After the practical failure of the department efforts to secure local and municipal regulation of buses, its activities were directed toward securing adequate state regulation. The State Legislature passed a motor bus regulatory law effective July 27 last.

Articles of general interest are mimeographed and sent out to all the leading publications in the territory. Articles of interest to the public utility industry as a whole are also, upon occasion, disseminated in this manner.

Newspaper reporters are encouraged to call upon the local public relations agents, who are authorized to give out at first hand any items of interest which, in the minds of the reporters, may constitute "news." The only instructions issued to our employees about giving news to the press is that they give full and complete information. The value of this personal contact with the reporters was demonstrated this summer by the manner in which Tecumseh Park, a picnic resort operated by the company, located between Springfield and Dayton, was popularized by the newspapers "playing up" the various picnics and outings which took place. A favorable impression was likewise created and much publicity secured by mailing to the society editors of certain papers lists of passengers booked over the company's lines for the regular weekly excursions to Niagara Falls.

Taking advantage of the space at our disposal on the interior bulkheads of the cars, cards are displayed from week to week setting forth messages which we are seeking particularly to drive home to the public. On occasion these cards have appeared in series, such as the "How Come" series, the "Why" series and in the Zanesville City cars a series of Biblical quotations. The messages carried in these cards cover a wide range, extending all the way from seasonal greetings to safety slogans. The type used on the cards and arrangement are frequently changed.

The company's time folders are revamped from time to time and a particular effort has been made to secure for them wide distribution by means of metal racks placed in each of the passenger cars, in all stations, and in the Yellow taxicabs of the principal cities along the line.

Dates and appointments have been arranged so that the general manager could appear before commercial organizations, granges and meetings where the company's story could be told to good advantage.

The newspaper advertising, previously handled by the traffic department, was taken over July 1 along with the functions of the general passenger department. Steps were immediately taken to revamp all of the advertising copy. We have now adopted a standard space of three inches, set double column. No ad runs in more than two or three issues in any one paper. Among the subjects covered are timetable information, value of the traction to the community, superiority of the traction service from the standpoint of convenience, frequency and safety, rates, points of interest along the lines, and special events.

A much closer contact is maintained with the advertising managers, managers and editors of the various papers through correspondence and personal calls than had hitherto been the case. An attractive set-up of some particular advertising copy is made the occasion of a letter of commendation, and a particularly favorable write-up of any event of importance will bring a letter of appreciation.

A form of outdoor publicity which has met with popular approval has been the placing of illuminated highway signs, 5 x 12 ft. in size, at points where entrance is made to the larger cities along the routes.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Traffic Association at Webster Lake, Ind., Sept. 14, 1923.

†Mr. Bland is director of public relations of the Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Electric Railway Company, the Lima-Toledo Railroad Company, the Dayton & Columbus Transportation Company, and the Columbus & Zanesville Transportation Company.

A radical departure from the established custom was the placing of all passenger activities formerly under the traffic department under the department of public relations. This included all matters connected with the passenger solicitation, publicity, advertising and the supervision of all agents and baggagemen who were, coincidently, taken over from the operating department.

More efficient telephone contact with the public has been established by installing a central telephone exchange at Springfield, where inquiries, complaints, etc., are handled with much better dispatch than was formerly the case. A similar plan is being worked out for Columbus and Dayton. Some of the other things which we have in mind are a house organ, a weekly publication for general distribution, organization of a safety campaign among employees and public, organization of a beneficial association among employees and general educational work among agents and trainmen.

The effect upon the general public of the department's operations thus far is difficult to estimate. It is to be expected that results will be slow in making themselves manifest. We do know that our efforts have attracted attention, that our car cards are being read, that the legends carried along the sides of the passenger cars have attracted attention. We do know that the attractive, well-kept appearance of the company's motor buses have induced patronage and caused favorable comment.

C.E.R.A. Traffic Men Hold Summer Meeting

THE Traffic Section of the Central Electric Railway Association held its annual summer meeting at Webster Lake, Sept. 14-15, jointly with the publicity committee, of which John S. Bleecker, general manager Indiana, Columbus & Eastern Traction Company, is chairman. About fifty persons were present.

The traffic meetings occupied the first half of the initial day's session, and the publicity meeting was held the afternoon of the same day. The remainder of the time was spent in fishing and shivering. There was much more shivering than fishing done, however, because of some early winter weather, a great shortage of blankets and no heat.

The publicity meeting was opened by Mr. Bleecker with a report on the work of the state committee on public utility information in the C. E. R. A. territory. He pointed out that Indiana was the banner state in supporting its committee, all but two Indiana companies cooperating. About half of the Ohio companies are helping.

More than half a dozen persons, including John C. Mellett, Arthur V. Bland, C. L. Van Auken, substituting for E. F. Kelley, Samuel Riddle, J. W. McCloy, G. L. Graffan and Labert St. Clair, either spoke or read papers.

Mr. Bland's paper, in which he told about the work that is being done under Mr. Bleecker's direction by the public relations department of the Indiana, Columbus & Eastern Traction Company and associated companies, was illustrated by an effective display of posters and advertisements. After Mr. Bland had spoken, Mr. McCloy explained the display. Mr. Bland's paper is abstracted elsewhere in this issue.

Explaining that the Advertising Section of the American Electric Railway Association not only co-operated very closely with all state committees on public utility information but rendered service to all local companies, Mr. St. Clair urged greater use of the association's advertising and publicity facilities.

American Association News

Special Train Service to Atlantic City

A SPECIAL all-steel Pullman train will be operated from Chicago to Atlantic City over the Pennsylvania Railroad, for those attending the A.E.R.A. convention. This train will be an exact counterpart of the Broadway Limited, and assurances have been received from the Pennsylvania Railroad that everything possible will be done to make the trip pleasant and comfortable.

The train will leave Chicago on Saturday, Oct. 6, at 1 p.m., Central time; Fort Wayne, 3:58 p.m.; Lima, 5:12 p.m.; Crestline, 6:43 p.m.; Mansfield, 8 p.m.; Alliance, 10:08 p.m., and Pittsburgh on Sunday, Oct. 7, at 12:09 a.m. It will arrive at Atlantic City at 10 a.m.

Delegates from Toledo, Detroit and vicinity can connect with the Chicago special at Mansfield or Pittsburgh, by taking the regular Pennsylvania Railroad train leaving Detroit on Saturday, Oct. 6, at 1:20 p.m., Eastern time; Toledo, 3:15 p.m.; Mansfield, 5:50 p.m., and arriving at Pittsburgh at 10:15 p.m.

Delegates from Cleveland can connect with the special at Alliance or Pittsburgh, by taking the Pennsylvania train leaving Cleveland on Saturday, Oct. 6, at 6:05 p.m.; Alliance, 7:33 p.m., Eastern time, and arriving in Pittsburgh at 9:35 p.m. Those from Akron, Youngstown and vicinity can connect with the special by taking the regular Pennsylvania train leaving Akron on Saturday, Oct. 6, at 5:45 p.m., Eastern time; Youngstown, 7:27 p.m., and arriving in Pittsburgh at 9:25 p.m.

The diagrams of the Pullman cars, on the Chicago special, will be kept at the office of H. J. Kenfield, chairman of the transportation committee, 431 South Dearborn Street, Chicago. Railroad tickets, however, must be secured from the regular ticket agents. The committee requests that applications for space on the special be made as early as possible, so that the railroad may know at the earliest possible moment what equipment will be required for the train.

Transportation from the Pacific Coast is in the hands of W. V. Hill, manager California Electric Railway Association, 58 Sutter Street, San Francisco. Two through Pullman cars will be run from Oakland to Atlantic City. These will be attached to the Pacific Limited leaving San Francisco on Wednesday, Oct. 3, at 6 p.m., and arriving in Chicago on Saturday, Oct. 6, at 4 p.m. The cars will be transferred to the Pennsylvania train, leaving Chicago on Saturday, Oct. 6, at 8:10 p.m. and arriving in Atlantic City on Sunday, Oct. 7, at 7:40 p.m.

Additions to the Convention Program

SOME additions to the convention programs of the American Electric Railway Association were announced by Secretary Welsh this week.

Elisha Lee, vice-president Pennsylvania Railroad, will speak at the session on Thursday morning, Oct. 11. His address will be on "The Relation of Management and Employees."

Alexander Forward, member of the State Corporation Commission of Virginia, has agreed to participate in the symposium on Public Utility Commission Regulation. This is part of the proceedings on Wednesday morning.

The association expects to publish within a few days its final program. This will include not only the program of the technical sessions and entertainment but it will contain considerable other matter of interest to delegates at the convention.

The association urges all companies who expect to be represented at the Atlantic City convention to forward advance registration cards as soon as possible.

Standards Committee Passes on Recommendations

ON account of the revision of the Engineering Manual now under way, the Engineering Association committee on standards had an unusual amount of detail to consider at its meeting held in New York City on Sept. 14. The discussion and votes showed a desire to make the Manual as useful as possible without unnecessary bulk. As the volume will be permanently bound it is necessary to have its parts revised up to the date of publication. The committee considered all recommendations, which require such consideration, contained in committee reports and prepared a report on them to be printed in advance of the convention.

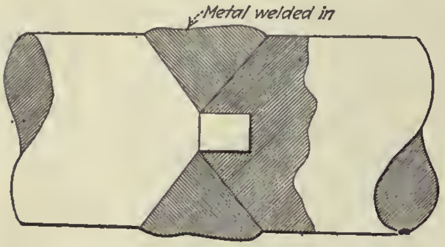
The meeting was attended by these members: C. C. Beck, J. A. Brooks, H. A. Johnson, C. G. Keen, John Lindall, H. H. Norris, N. W. Storer and N. B. Trist. G. C. Hecker acted as secretary.

Maintenance of Equipment

Making Two Pony Axles Out of Three Worn Ones

IT IS regular practice on the part of the Tennessee Power Company (Chattanooga Railway & Light Company) to cut the good parts out of worn pony axles, joining pieces by means of electric welding to produce an axle that is practically as good as new.

The abutting ends of the two pieces, which are to form the axle, are prepared as shown in the accompanying sketch. One end is drilled with a hole ⅝ or ¾ in. in diameter and about an inch deep, while a corresponding projection is turned on the other. This provides a dowel connection which insures centering of the pieces with respect to each other.



Joint Between Two Pieces of Reclaimed Pony Axle

A groove for the welding metal is formed by cutting away the abutting ends in cone form, and metal is gradually built up to and above the top of the groove by means of the electric arc.

Broaching Armature Bearings

By O. A. NORENE

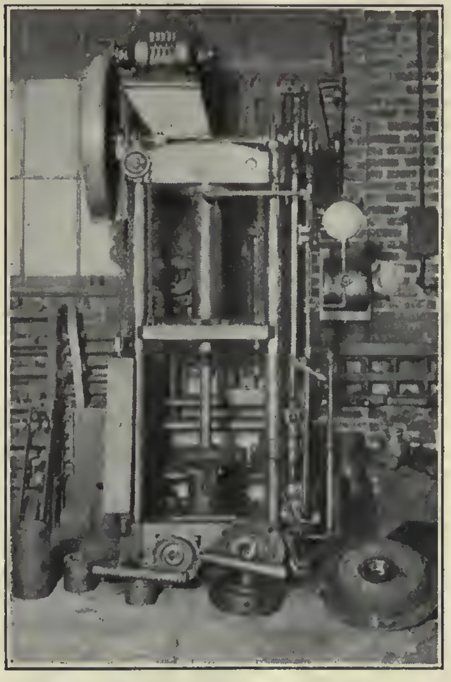
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

IN OMAHA we have changed a large part of our armature bearings, which originally were cast brass, to cast steel, babbitt lined. At first we had some trouble with the babbitt working loose in the steel shell, but this has now been entirely overcome by pressing a steel broach through the bearing to expand the babbitt, by the use of a Watson-Stillman 30-ton hydraulic vertical force press, which is shown in the accompanying picture.

Housings Mounted in Chuck and Boring Bar in Position for Boring Bearing

The bearings are first rough-bored to approximately 1/16 in. smaller than finished diameter, to determine the size of hole to bore to get the desired pressure. The broaches are designed so that all the operator needs to do is caliper the small end of the broach and set the cutters on the boring bar accordingly. A No. 17 Davis expansion boring bar is used for boring the armature bearings.

For the broaching operation the rough-bored bearings are placed in steel sleeves of ample strength to withstand a pressure of from 15 to 20 tons without distortion. The sleeves are designed so that a bearing which has had the broach pressed through it is reversed and the bearing is pressed out by the next bearing. This operation is repeated.



The Broaches Are Forced Through the Bearings in This 30-Ton Hydraulic Press

Bearings are next pressed into the solid housing at a pressure of from 3 to 6 tons, depending on the size. The broaches are made with a taper of from 0.015 in. to 0.018 in. and are pressed through bearings at a pressure of from 8 to 15 tons. We have used this process for about two years and it has eliminated practically all loose bearings in the armature housing. For the finishing bore to fit the armature shafts the housings are held in specially designed chucks in the lathe and finish-bored to fit on the shafts on which they are to be used. This method assures the bearings being bored in perfect alignment and very little fitting is required.

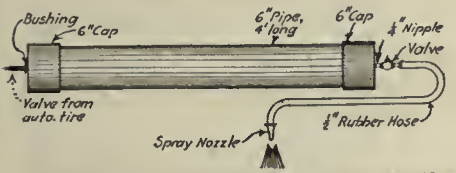
Chucks for Mounting the Armature Housings

Applying Creosote to Poles by Compressed Air

WHERE poles are defective it is the practice of the Pacific Power & Light Company to saw them off just above the ground line, pull out the stub and reset the pole. Before resetting, the pole is given a treatment of creosote, usually applied with a brush. The brush method, however, does not insure that the creosote will reach inside the cracks and holes, and to overcome this disadvantage R. J. Smith of the operating department has devised a container for holding and applying the creosote to poles at the job by compressed air.

A piece of 6-in. pipe 4 ft. long is fitted with caps at both ends. A ¼-in. nipple with a valve and a ½-in. hose with a small spray nozzle is attached to one end. The cap at the other end of the pipe has a ¾-in. pipe opening. This is bushed so as to receive a valve stem of a type used on automobile tires.

To fill the container the bushing



This Portable Container Provides Effective Method for Creosoting Poles

containing the valve stem is screwed out and creosote is poured in. The bushing is then screwed back into place and an ordinary tire pump is used to pump up the pressure in the pipe.

This container, together with its contents, can then be taken to the job and by opening the valve a stream of creosote is readily applied to the butt of the pole. This method forces the creosote to the bottom of all cracks and other openings in the pole and the time required to cover the butt of the pole by this method is considerably reduced.

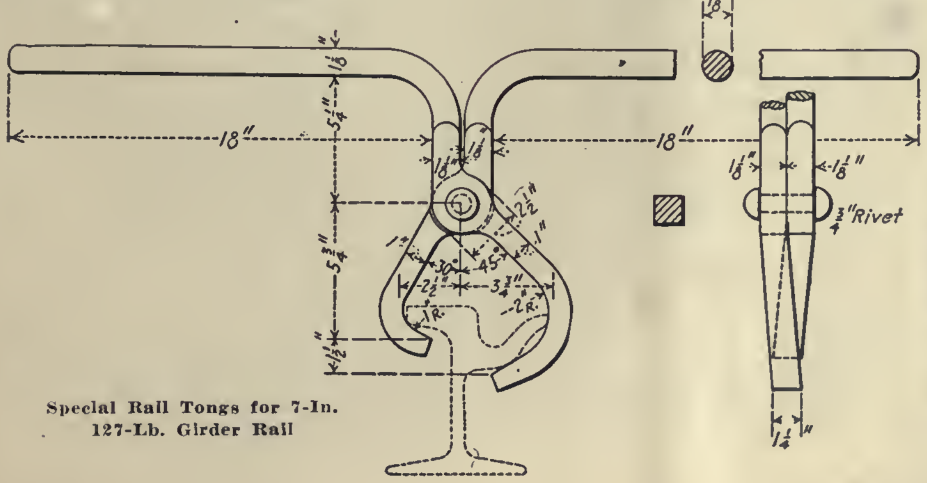
Special Tongs Equalize Load Handling Girder Rail

By Clifford A. Elliott

Engineering Department Pacific Electric Railway, Los Angeles, Cal.

SOME difficulty was experienced in handling 7-in. 127-lb. grooved girder rail with standard rail tongs. Due to the shape of the girder rail head and upper fishing, the handles of standard tongs when applied were not parallel to the rail base, which resulted in an uneven distribution of the load among the track laborers carrying the rail.

In order, therefore, to overcome this difficulty a special type of rail tongs has been designed by the Pacific Electric Railway, as shown in the accompanying illustration. The special tongs have one jaw longer and of different inside radius than the other, so that when applied to the rail head the bottom flange will be parallel to the handles and thus the load will be centralized, and trouble from unequal loading is prevented. Experience has shown that the use of these special tongs results in more efficient handling of the rail and considerable saving in time.



Special Rail Tongs for 7-In. 127-Lb. Girder Rail

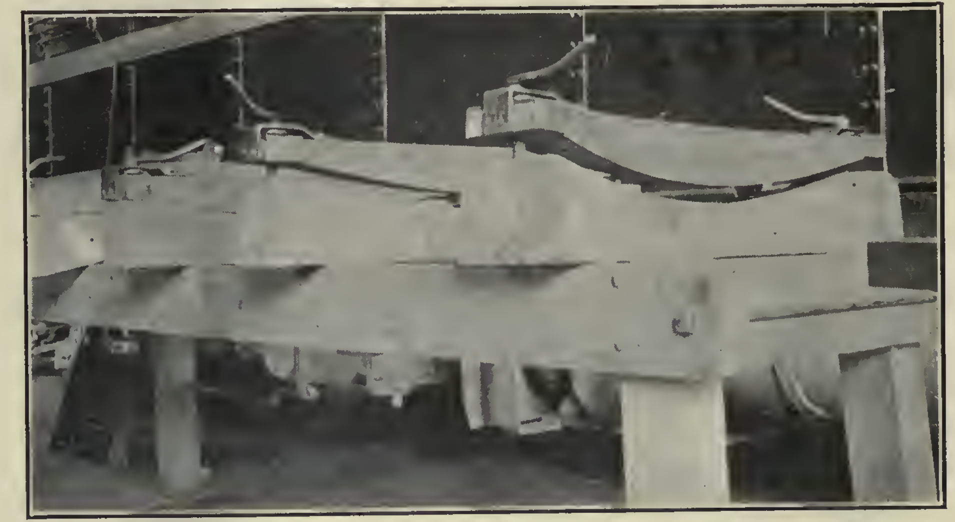
Molds for Bending Dasher Iron

THE Nashville Railway & Light Company secures a uniform and neat job in bending sheet iron for bumper covers by the use of curved molds, like those illustrated. The upper part of the mold is of hard wood, the lower part of cast iron, the upper piece being shod with flat steel to give it the necessary stiffness and to minimize wear.

The two parts of the mold are drawn together by means of clamp screws, each operated by a permanently attached handle. The screw is held in a fixed relation to the upper part of the mold by means of a collar near its upper end, which plays between bent pieces of flat steel screwed to the end of the block in the manner shown, the clearance between them being slightly more than the thickness of the collar.

Where the edge of the sheet is to be bent over, the part to be thus bent is allowed to project beyond the mold and is hammered down against the block, which is suitably cut away to give the desired form.

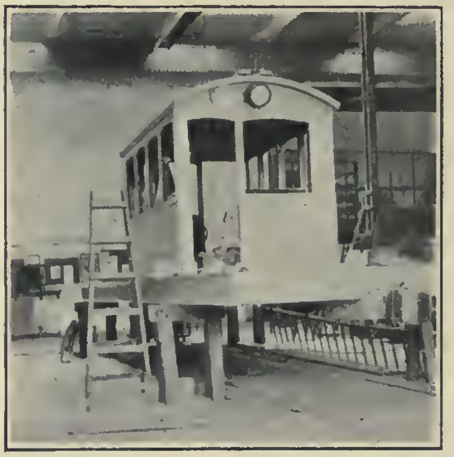
The molds rest upon a substantial framework, which can be placed near a car which is being fitted with a new or repaired dasher.



These Clamp Molds Are Used in Nashville for Bending Dasher Sheets

Unusual Locomotive Built at Chattanooga

THE Chattanooga Railway & Light Company is part of the Tennessee Power Company, which has a large hydraulic power plant at Hales Bar. The railway company was recently called upon to build an electric locomotive of original design for use in connection with construction work at the power plant. Among the specifications for this machine were that it should have a capacious platform for the handling of material, that the cab should be roomy so that ten workmen could be accommodated as passengers and that it should have capacity to haul three or four loaded freight cars.



A Combined Locomotive and Work Car Built at Chattanooga

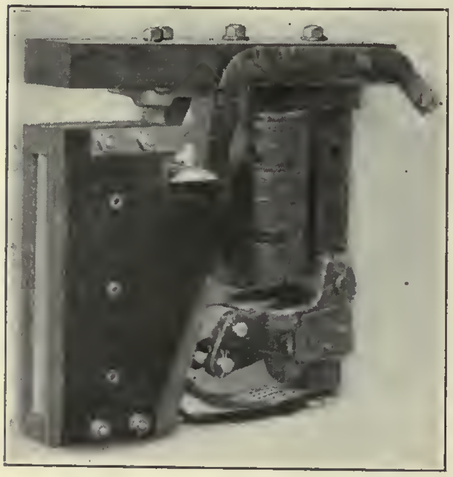
A photograph of the complete locomotive is not available, but the accompanying illustration is from one made recently in the shops at Chattanooga. It shows the platform built up on 12-in. I-beams, the platform having a width of 9 ft. 2 in. The cab is 7 ft. wide and 8 ft. high under the eaves. There is sufficient space on the floor outside of the cab to permit the carrying of a large amount of miscellaneous material and long bars, pipes, etc., can be carried along the sides. Seats are provided in the cab for ten passengers without inconveniencing the operators.

The locomotive is mounted on M. C. B. trucks with four 50-hp. motors; and air equipment of capacity ample for braking four freight cars is provided. A standard coupler is mounted at each end.

New Equipment Available

Improved Type M Control

To meet a demand for an efficient control for light-weight cars when the service requires frequent train operation the General Electric Company has designed a new light-weight type M control embodying improvements for this service over its standard control.



Contactor for Light Weight Control

The control is of the non-automatic type, having the same accelerating characteristics as the "K" control. It consists of a master controller which carries only small currents inside the car, while the motor control apparatus carrying the motor circuit current is installed underneath the car. This latter is grouped in two boxes for easy installation. The master controller is provided with both dead-man's handle and emergency brake feature.

A small door on the end of the contractor box gives easy access to the motor cutout. The contractor box has been designed to be insulated from the car body. The line breaker is a magnetically operated contractor, provided with a strong and efficient blowout that will rupture the overloads encountered in service. The arc chute is designed to be removed without tools and is vented to the atmosphere through an opening in the contactor box.

The contactor has the same type of removable arc chute as the line breaker. Removing the arc chute also removes the pole pieces, making the contact parts of the contactor and line breaker as accessible for repairs as are the contact fingers and segments of a drum controller when the arc chute is swung open.

The reverse consists of a solenoid-operated drum type switch mounted in a small sheet metal box having a removable cover. The master controlled is similar to a "K" controller with separate main and reverse cylinders.

The light-weight type M control has a capacity to operate trains of three cars or less, each car being equipped with four 60-hp. 600-volt motors or less.

High Carbon Welding Rods

A new metal for welding high carbon parts by either the oxyacetylene or electric welding process is being placed on the market by the Page Steel & Wire Company, Bridgeport, Conn.

The principal application of these high carbon welding rods is for the building up of worn surfaces where a high resistance to abrasive wear is desired. In electric arc welding this electrode maintains a stable and uniform arc. In gas welding the metal flows smoothly. With either process the finished weld may be ground, but is not readily machinable.

TEST OF WELD DEPOSIT

	Carbon	Scleroscope
Original metal	0.42	35
Two layers of weld metal gave:		
Outer surface of deposit	0.63	38
At a depth of $\frac{1}{16}$ in. from top	0.56	37
At a depth of $\frac{1}{8}$ in. from top	0.57	33
At a depth of $\frac{3}{16}$ in. from top	0.46	34

The accompanying table shows a typical result of weld deposits when made of a steel with 0.42 carbon content.

Automatic Heat Control for Solder Pot

A new electric solder pot with automatic heat control has been added to its line of labor-saving devices by J. D. Wallace & Company, Chicago, Ill. The use of this pot simplifies the problem of heating babbitt, white metal, wax and other materials which are slow conductors of heat.

When solder is overheated, it oxidizes, and this action results in a loss of material. With the new automatic heat-regulated solder pot when the solder has been heated to 600 deg. F. an automatic control goes into action, which maintains the temperature of the contents of the pot and prevents overheating and underheating.

Solder Pot with Automatic Heat Control

This control is an adaptation of the principle used in the steam gage. A volatile substance, which is very sensitive to heat, actuates a Bourdon tube, which makes and breaks the electric current, thus controlling the temperature of the contents of the pot.

The pot will accommodate 15 lb. of solder and will heat this amount to 600 deg. F. in twenty to twenty-five minutes. A 900-watt heating element is built around the entire container and heat is applied to all parts of the sides and bottom simultaneously.

When the container is once filled and the current turned on, the solder pot requires no attention until refilling is necessary. The pot weighs 13 lb. and operates on either 110 or 220 volts alternating current.

The News of the Industry

Side Lights on Toronto M. O. Meeting

Seattle Man Says City Was Outmaneuvered in Deal Taking Over Local Railway

There were several interesting side lights at the meeting of the Public Ownership League of America held in Toronto during the week ended Sept. 15. Sir Adam Beck, one of the principal speakers Monday evening, dwelt at length on the question of the amount of water being diverted at Chicago by the Chicago Sanitary District, to carry Chicago's sewage down the drainage canal. Sir Adam Beck says that every bit of water taken by Chicago to go down the drainage canal robs the Ontario hydro system of power by reducing the flow over Niagara. He called for a united movement against allowing Chicago to take any more water.

PROPAGANDA THROUGH SCHOOLS

Margaret Haley of Chicago, representing an organization of 7,000 school teachers in Chicago, said that this group of teachers was prepared to move directly and actively against all private utilities. According to her statement, school teachers in Chicago raised $15,000 to fight a constitutional amendment to allow Chicago to own the local transit system and conduct it under private operation. Miss Haley also told how the teachers had used school children to secure signatures to petitions worded, "Do you want 5-cent car fares and 50-cent gas?"

Jenny Buell of Michigan said that the farmers of Michigan are fighting hard for public ownership of electric power sites. She accused individual utilities and the Michigan Bureau of Public Utility Information of giving out false information with reference to the situation in Michigan.

SEATTLE BLUNDERED

O. T. Erickson, Seattle, said that Seattle had made some very stupid blunders. The Skagit River project is one of them. On this plan $15,000,000 had already been spent. He said that private utility men and engineers had handed a juicy "lemon" to Seattle in Skagit. Mr. Erickson pointed out some mistakes made by private utilities. The purchase of the Seattle street railway was a blunder in administration. According to Mr. Erickson the city paid more than it should have for a worn out system. This in itself showed the frailty of public officials. The 5-cent fare humbug was set before the people and some of them fell for it. In order to make the road pay it has been necessary to raise the fare, but, with the higher fare the city is gradually paying off the debt and once the system is owned outright Mr. Erickson anticipates that there will be successful operation at a lower fare. All of this, however, points to the lack of experience on the part of public officials and it shows the need for greater ability in handling publicly-owned and operated utilities.

Carl D. Thompson, secretary of the League, made a plea for more funds and greater support. He pointed out that last year he had a budget of $7,000 to assist communities engaged in controversies with privately-owned properties and that aid was given to thirty-two separate communities. He said that he was opposed by the resources of the National Electric Light Association, bankers, and other interesting in preserving the present order of property. A voluntary collection was made following Mr. Thompson's report, and pledges made indicated he would have a slightly larger fund for 1924.

It was apparent from the tenor of the convention that the League will concentrate of super-power. The first moves are definitely planned for Washington and Oregon, where the League is attempting to have state-owned and operated super-power systems.

Saginaw to Start Up Soon

Active work looking to the resumption of electric railway service in Saginaw has started, and although the officers decline to say when the city can expect the service it is believed that cars will be operating by Nov. 1, or soon after that date.

The $400,000 fund that will be used to rehabilitate the property has been deposited with the treasurer, and under the terms of the franchise Otto Schupp, grantee, assigned the contract to the Saginaw Transit Company, and also the taxes owed by the Saginaw-Bay City Railway, amounting to more than $50,000, were paid.

Offices independent of the other city utilities have been established and work has started in reconditioning the rolling stock that has stood idle since Aug. 11, 1921, when railway service terminated.

Those who will finance the project have elected Charles S. Kressler, Manistee, and Fred J. Fox and Otto Schupp, Saginaw, their directors. The three, with the nine approved by the Mayor and two circuit judges, compose the board and have elected Mr. Kressler president and general manager, Mr. Schupp vice-president and L. F. Swartout secretary. Financing of the property has been approved by the Public Utility Commission.

Bridge Destroyed at Springfield

Quick Action by Massachusetts Road Saves City from Isolation Just Before Exposition

Five of the seven spans of the North End bridge over the Connecticut River at Springfield, Mass., were destroyed on Sept. 8 by fire. Within an hour after the blaze had been discovered the only bridge was thus put out of service over which electric railways running to Holyoke, Westfield, Hartford via the west side and various local points to the west could enter or leave the city. This created an emergency for the Springfield Street Railway that had to be met by quick and vigorous action.

In order to meet the emergency the company within a period of ten days laid 6,571 ft. of track at a financial outlay of approximately $125,000. The large amount of special work involved greatly increased the difficulties and expense incidental to this quick achievement.

The new Hampden County Memorial Bridge, over which it was intended to have electric railway cars pass, had not been connected by tracks and wires with the local railway system, because of a controversy over routes which had only lately been settled. All materials had, however, been received for the Vernon Street tracks and switches that were to provide an approach from Main Street to the new bridge. Before the flames had died down at the old bridge the Springfield Street Railway had begun action to set up an emergency service that would take care of traffic that night and for the next two or three days and to rush the Vernon Street connection to completion in the shortest possible time, this being particularly enjoined by the fact that the Eastern States Exposition, with its great crowds of residents and visitors, was due to open on Sept. 16.

Meanwhile, cars for the Hartford west side line had been operated over the new bridge and by way of the exposition grounds beginning Sept. 9 three street railway buses were running over the bridge in place of one, many independent buses also being operated over the same route, and a shuttle trolley service was put on to make connections between the bus service and the interurban car lines. On the west side as on the east the tracks for regular car service to the new bridge had not been laid. The most that could be done immediately was to establish transit across the bridge from Main Street so as to get the emergency service in working order before the opening of the exposition on Sept. 16. The total loss from the burning of the bridge will probably exceed $500,000. It is likely that the North End will be replaced, but as this may not be accomplished for several years, it will be the problem of the local railway to make the new bridge and its connecting loops do full service.

Oregon Utilities Organize Information Bureau

Leading public utilities of the state have just formed a joint organization to be known as the Oregon Public Utility Information Bureau. The purpose is to endeavor to promote among the people of the state a closer understanding of the services and problems of the public utilities which form such an essential factor in the progress and development of modern community life.

Identified with the bureau from the start will be seven of the largest public utility companies in the state, with a combined invested capital aggregating approximately $125,000,000. These companies now serve about 200,000 customers with light and power, gas and heat and provide electric railway transportation for many communities. Likewise, these companies now have on their books between 12,000 and 15,000 local stockholders in their home territory, and this number is growing each year under the operation of what is known as the "customer-ownership" plan.

Nearly 150 of the leading cities and towns in the state receive service from this group of companies, which includes the Portland Railway, Light & Power Company, Portland Gas & Coke Company, Pacific Power & Light Company, Northwestern Electric Company, Mountain States Power Company, Eastern Oregon Light & Power Company and the California-Oregon Power Company.

For several months preliminary negotiations have been carried on and the final organization was completed during the week of Sept. 8 with Franklin T. Griffith, president Portland Railway, Light & Power Company, as chairman.

This committee has selected as director of the Public Utility Information Bureau W. P. Strandborg, for the past eight and one-half years in charge of the publicity and advertising department of the Portland Railway, Light & Power Company.

The headquarters of the Oregon bureau will be Suite 820, Electric Building, Portland.

Special Bulletin Issued by Public Utility Information Committee

A pamphlet, prepared for the use of speakers in the celebration of Constitution Week in Louisville from Sept. 10 to 17 was sent out by the Kentucky Committee on Public Utility Information as a special bulletin in the belief that the material contained therein would prove especially interesting to all persons interested in utilities and their problems. In making the pamphlet a special bulletin, the thought occurred to the committee that perhaps the editors on its mailing list might care to utilize the Louisville celebration of Constitution Week as a basis for editorials.

Tri-City Railway Tears Up Tracks

Tracks of the Tri-City Railway, in the town of Rockingham, extending from the city limits of Davenport to the end of the line, a distance of 1,300 ft., have been torn up. This was done in compliance with an ordinance adopted by the Rockingham town council in August. Officials of the town of Rockingham declared that the company would be ordered to tear up the tracks of the Credit Island part line which are inside the limits of the town.

The company, according to the officials, has been operating in the town of Rockingham ever since the town was incorporated, but has never had a franchise. The railway is the only means of public transit to the island.

"Pave between the tracks and a foot on each side or tear up the tracks immediately," the ordinance said. The town clerk handed a copy of it to R. J. Smith, general manager of the traction company. He issued orders to the track crew to rip up the rails and ties as soon as they could get to them.

In the present financial condition Mr. Smith said that his company could not possibly consider paying for the pavement between the tracks and a foot on each side.

The street will now be paved from curbing to curbing, uninterrupted by car tracks, as the council let the contract some time ago.

The same track crew ripped up 2,000 feet of track running from Rolff Street to Forest Park. The line has not paid any revenue, according to General Manager Smith and the company could not afford to maintain the track, to say nothing of attempting to operate cars over it. Track torn up on Rockingham road and on the Forest Park lines will be salvaged as junk.

Illinois Trainmen Receive Five Cents an Hour Increase

Trainmen of the Illinois Traction system of the Illinois Power & Light Corporation are to receive an increase in wages of 5 cents an hour as the result of an agreement between the company officials and a committee representing the union held at Springfield, Ill., on Sept. 7. New wage contracts which will not expire until Dec. 1, 1924, but which will date from Sept. 1, are now in effect. While the increase agreed on is only 5 cents an hour, putting the increase in wages in effect before the expiration of the old contract will mean an actual increase of 6¼ cents an hour for the men.

Under the old wage contract motormen and conductors in passenger service promoted prior to Jan. 1, 1921, have been paid 57½ cents an hour and those promoted after Jan. 1, 1921, have been paid 55 cents an hour. All motormen and conductors in freight service have been receiving 60 cents an hour and brakemen have been receiving 45 cents an hour.

The increase will average from $15 to $20 a month for each employee including conductors, motormen, brakemen and others who are members of the union. The total salary increase will add approximately $60,000 a year to the company's payroll.

Proposal for Elevated in St. Louis

The suburban lines forming one of the constituent companies threaten to break away from the United Railways, St. Louis, and build an elevated line along the present right-of-way of the Hodiamont line of the United Railways. This will be done, however, only if the holders of the $4,500,000 of the general mortgage 5 per cent bonds of the United Railways and of $2,000,000 of the consolidated bonds of the old St. Louis & Suburban Railway (the present Hodiamont line) are successful in a foreclosure suit they will file in the United States District Court.

Where issues already due have been provided for by receiver's certificates, it has been the contention of attorneys that under-lying issues automatically succeeded them as prior lien. It is on this point that the legal question would be thrashed out.

In his order last Monday Judge Faris authorized a total interest payment of $381,728 to be made on Oct. 1. The $4,200,000 bonds which were authorized extended from Oct. 1 are secured by mortgages on the Cass Avenue, Compton Heights and Lindell system.

Office of President No Longer to Be Revolved

Announcement of the election of Edwin M. Walker as president of the Schenectady Railway was made in Schenectady on Sept. 18 by Harry B. Weatherwax, former president of the company, returning to Albany from New York, where he attended a directors' meeting of the company. As stated previously in the ELECTRIC RAILWAY JOURNAL, Mr. Walker will enter upon his new duties on Oct. 1.

The Schenectady Railway is owned jointly by the Delaware & Hudson and the New York Central. It has been the practice in the past to alternate the presidents each year, one year the D. & H. naming the president and the next year the New York Central naming a man to that position. Mr. Weatherwax announced that this practice is to be abandoned and that a president was being named to hold that position permanently. Mr. Weatherwax gave out this statement:

> With the strike over it has been decided by the board of directors of the Schenectady Railway to abolish the managing committee, consisting of Harry B. Weatherwax, president, and James F. Hamilton, vice-president and general manager, who have alternated yearly in these positions for many years past, and appoint a permanent president, who should reside in Schenectady and become part of the city's civic life.

Public Service Railway Restores Service

Company Decides to Abide by Order of Chancellor Walker, Directing It to Resume Operation—Needs $2,500,000 of Additional Revenue per Annum and Will Appeal for Ten-Cent Fare, Hoping Later to Be Able to Adopt Boston Plan of Reduced Rates for Short Riders—Many Interesting Points Covered in Opinion by Chancellor

SERVICE is being restored on the lines of the Public Service Railway of New Jersey. The first cars were run on the company's Bergen division on the afternoon of Sept. 20. Other lines were then being prepared for service and it was expected on Sept. 21 that all the lines would be restored to service within the next few days. It was just fifty days from the time the cars were run into the carhouses following the strike of the employees until the first car was run in Bergen County.

Restoration of service by the company followed upon the issuance by Chancellor Walker on Sept. 17 of a mandatory order calling for a resumption of service at once. The Chancellor said that it was not an answer to say that the company could not operate at a profit and therefore should not be obliged to run at all. He said the answer to that contention was that if the railway stood still long enough it would be absolutely ruined. This would ultimately result in the appointment of a receiver under insolvency who would be directed to operate the road under order of the court. Such an ending, said the Chancellor, would be disastrous to those owning the securities of the company and to its other creditors, unless the property at receiver's sale brought sufficient to discharge all its obligations in full, which was not likely.

The course was open to the company of appealing from the ruling to the Court of Errors and Appeals, but on Sept. 19 it issued the following statement announcing its decision to comply with the order:

"The Chancellor, the highest judicial officer of the state, having ordered the railway to resume service, the company will obey the order and service will be restored as soon as practical conditions will permit, which it is hoped will be not later than next Monday morning (Sept. 24). Of necessity the service will be a little disorganized at first, but every effort will be made to straighten it out as rapidly as possible. For example, it will take several weeks to change over the equipment from open to closed cars, work which is ordinarily done earlier in the year.

"To anyone familiar with the facts, it is apparent that the company must have substantially increased revenues, if it is to meet the largely increased costs of operation caused by the increase of wages, which it is necessary for it to pay to secure resumption of service; otherwise, the property of the railway must of necessity pass through the disintegration process into its constituent parts, which results, of course, in a demoralization of the system, a large investment loss, inability to finance extensions and betterments for the future and the payment of several fares by the public in lieu of a single fare.

"To avoid this calamity the company must have at least $2,500,000 of additional revenue per annum. It is believed that a 10-cent fare will produce this money and that no other remedy is immediately available. The company will therefore file with the Board of Public Utility Commissioners a 10-cent rate without charge for transfer. As the business of the company grows and develops, as destructive and unfair competition, which is the real cause of the high fare, is removed through the co-ordination of service or otherwise, or as declining costs make possible, it is hoped that either this base rate can be lowered or that while retained as the base, a lesser fare may ultimately be worked out for short riders in congested centers. This will be following the plan that has been worked out so successfully in Boston. The Chancellor in his opinion says that a resumption of service should stimulate the settlement of existing problems.

"The company appeals to the Board of Public Utility Commissioners, to municipal officers and to the public for co-operation in making it possible to operate the property upon a sound basis of economics and in a manner to give satisfaction to the traveling public. The company will do its part."

After fifty days of suspension of service the employees were naturally scattered into other walks of life, but it is said that unusual success has attended the efforts of the company to round up its former men. William Wepner, head of the union, stated on Sept. 20 that despite the long period of inactivity there would be possibly a loss of only 5 per cent of the total number of men employed when the strike broke. The number employed on all lines was 6,500.

The ratification of the company's plan by the men at the various union headquarters over the state, voted on Wednesday night was said to be unanimous. The company agrees to pay the men an increase of 20 per cent and allow one day off in eight. The latter will cause the employment of an increased number of men, for the day off plan is an entirely new one. The contract is to run for three years and a working day calls for a full nine hours. On the wage basis men in the employ of the company for more than a year will receive 60 cents an hour and operators of one-man cars 65 cents an hour.

It should be remembered that two companies, the Public Service Railway and the Public Service Railroad, the so-called fast line, were both involved in the various proceedings before the courts and the commission in connection with the suspension of the service. The railroad operates under the steam railroad act, and while it is an important part of the entire railway system, the great bulk of that system is comprised within the corporate identity of the Public Service Railway. Thus is explained in part the alternative references to the "railroad" and the "railway" contained in the official orders and the opinion of the Chancellor. The opinion on which the order of the Chancellor was based follows:

In Chancery of New Jersey.

Between
THOMAS F. MCCRAN, attorney general, for and in behalf of the State of New Jersey,
Informant,
and
PUBLIC SERVICE RAILWAY COMPANY,
Defendant.

54-300.
On Information.

Opinion.

1. A preliminary mandatory injunction will issue to compel the restoration of a *status quo ante* in aid of a suit at law where irreparable damage would result from its being withheld.

2. Where a *mandamus* is sought in a court of law to compel a public utility corporation to perform its duty to the public, the court of chancery will enjoin the performance of that duty pending the suit at law.

3. It is not a defence that the company cannot operate at a profit; that is not the test: the duty resting upon a *quasi* public corporation must be performed, or its privileges and franchises must be surrendered; it cannot discharge its duty on and off, as it may find it profitable to do so.

4. It appears that a receiver may be appointed for a public utility corporation to discharge its duty to the public in the event of its not obeying the mandate of the court.

On application for mandatory injunction in aid of suits at law.

THOMAS F. MCCRAN, *attorney general, and* WILLIAM NEWCORN, *assistant attorney general,* for the State.

ROBERT H. MCCARTER, FRANK BERGEN, MERRITT LANE, E. AMBLER ARMSTRONG *and* WILLIAM H. SPEER for defendant.

WALKER, *Chancellor.*

The attorney general has filed an information on behalf of the state, in which he shows that the defendant company was organized and created under a consolidation agreement dated Aug. 20, 1907, between sundry street railway companies, and shortly thereafter it entered into an agreement of consolidation with certain other street railway companies operating in the northern part of the state, and thereby became possessed of all rights, privileges and franchises, subject to all restrictions, disabilities and duties of the corporations so consolidated.

Under the act of consolidation and merger it was provided that all rights, privileges and franchises, and property of each of such corporations, was transferred to and vested in such new corporation; and that it has also acquired other street railways by long-term leases, thus forming a united and complete system of about 850 miles of street railway tracks in 142 municipalities, and took possession of such railways and operated such system from the dates of such leases and entry upon the properties respectively, until Aug. 1, 1923, carrying in recent years about 1,000,000 passengers per day; that prior to Aug. 1, 1923, employees of the defendant company voted that a strike should go into effect on said date unless the terms and demands of the employees were met or conceded by the corporation, which it refused; such strike went into effect, and the company has failed to operate its cars from that date up to the present time, notwithstanding the duty imposed upon it, a common carrier, having franchises from the state to provide proper service for the citizens thereof, and more particularly for the inhabitants in the communities served by such corporation.

The information also charges that the failure of the defendant to operate its cars deprives the state and its municipalities of revenue to which it is lawfully entitled by way of taxes on its gross income, and jeopardizes the investments of its bondholders and stockholders, and those of its subsidiaries; that it deprives the citizens, and more particularly the inhabitants of the municipalities, of the service to which they are entitled by the company; and that the corporation has obligations which it cannot meet unless its road is operating, thereby working irreparable injury upon the state, its subdivisions and citizens.

Further, that the Board of Public Utility Commissioners of this state, on Aug. 9, 1923, served a notice upon the defendant of a hearing in the matter of its refusal to operate its road, and, after hearing, and on Aug. 14, 1923, made an order directing the defendant forthwith to furnish adequate and proper service and keep and maintain its property and equipment in such condition as to enable it to do so; that the defendant failed to comply with the terms of said order, and on Aug. 17, 1923, the board made application to the New Jersey Supreme Court for a writ of *mandamus* to compel the company to obey the said order, and on the date last aforesaid an alternative writ of *mandamus* was allowed, and served upon the defendant company on Aug. 28, to which the company filed an answer, wherein it set forth that by reason of the increased cost of operation it was impossible for it to comply with the order of the board, which proceedings are pending and undetermined; that by reason of the company possessing exclusive grants to operate its railway system, it is bound to perform that duty until it has lawfully surrendered, suspended or abandoned its franchises and privileges by the legally expressed consent of the state.

This information further shows that on Sept. 4, 1923, the attorney general filed an information for a *quo warranto*, inquiring by what right the defendant company exercises the franchises and privileges acquired by it at the time of the consolidation and merger agreements aforesaid, and by what right it refuses to operate its cars and perform the duty required of it under and by virtue of the privileges and franchises acquired by it as aforesaid.

The information before me prays that in aid of the *mandamus* and *quo warranto* proceedings mentioned, and in order to preserve the rights of the public, that a mandatory injunction be issued requiring the defendant company forthwith and pending the determination of said suits at law, to resume the operation of its railways and render service to the citizens of New Jersey; or, in the alternative, upon the continued refusal of the defendant company to operate its railways and discharge its public duty as aforesaid, that a receiver be appointed to take charge of the property of said company and operate the same until the final determination of the actions at law now pending. This succinctly states the issue tendered by the attorney general on behalf of the state.

The defendant company has answered, and while this is not a final hearing, the case has been fully submitted on pleadings and affidavits on both sides. The gravamen of the answer is that the company cannot operate without loss, and it claims that therefore it should not be compelled to operate at all. That present operation, that is, operation pending a settlement of its dispute with its employees, would be at a loss may be conceded for the purpose of the decision of the matter before me.

In arriving at a determination in this matter I deem it unnecessary to consider the question of the prospective loss of taxes to the state or municipalities, or of interest of the bondholders or dividends of stockholders of the company. The question transcends any such considerations and, to my mind, turns upon the single question of the power of this court to grant the injunction prayed for because of the public duty owed by defendant company to the citizens of this state, and that irrespective of whether such operation can be carried on with profit or with loss.

Mandamus is the appropriate remedy to compel a street railway company to operate its road for the benefit of the public. Hamilton Township vs. Mercer County Traction Company, 88 N. J. L. 485. In this case in the Court of Errors and Appeals, 90 N. J. L. 531, Mr. Justice Swayze said, at page 534, that the writ of mandamus is used to enforce a public duty which may sometimes grow out of a contract as well as out of a statute, citing Wilbur vs. Trenton Passenger Railway, 57 N. J. L. 212; Bridgeton vs. Traction Company, 62 N. J. L. 592; Rutherford vs. Hudson River Traction Company, 73 N. J. L. 227; Pleasantville vs. Atlantic City Traction Company, 75 N. J. L. 279; Camden vs. Public Service Railway, 82 N. J. L. 246. Here the duty arises out of statutory and charter obligation.

It is true that in McCran, attorney general, vs. Western Union Telegraph Company, 120, Atl. 515, I held that *mandamus* and not mandatory injunction is the proper remedy to compel the performance of a public duty enjoined upon a quasi public corporation; and so it is. But in the same case I also held that an injunction would issue to preserve the status pending the *quo warranto* suit at law; for, if it were not for the injunction, the public duty owed by the defendant to the state would not be performed during the litigation over it. And that is this case; unless a distinction is to be made between an injunction to preserve an existing status and one to restore a *status quo ante*. As a fact, the injunction in the Western Union case amounted to a mandatory one, because the company had refused to perform the duty of receiving and transmitting messages of public officers free of charge under the statute. And while the writ was couched in negative terms and restrained the company from refusing to accept and transmit the messages, because that was the prayer of the information in that case, nevertheless, the injunction compelled the corporation to receive and transmit them, and was, consequently, in effect, a command to do an affirmative act.

Chancellor McGill in National Docks Railway vs. Pennsylvania Railroad, 54 N. J. Eq. 10, at page 16, said that his understanding was that our courts have always recognized the right of a court of equity in a proper case to grant a mandatory injunction after preliminary hearing, even though that be the whole relief sought, citing numerous cases.

In granting temporary injunctions to protect easements, as in other cases, the court does not take jurisdiction for the purpose of settling the rights of the parties permanently, but simply to preserve the property until the legal title to it is established. The title which the plaintiff must show in such a case is not, of course, an incontestable one; he makes out a sufficient case when he satisfies the court that his claim is a substantial one and that there is reasonable ground for doubting the validity of the title of his adversary. The injury against which protection is sought is that which is likely to occur before the question of title between the parties can be settled, that is, in the limited time before a decision of the pending suit can be had. Pomeroy's Eq. Jur. (2 ed.) 1970, citing Fulton vs. Greacen, 36 N. J. Eq. 216; Todd vs. Staats, 60 N. J. Eq. 507. In the latter case an injunction was denied because irreparable injury was not shown. See page 513. The instant case is not one of easement, but the principle applies.

Where a gas company, having a

franchise and virtual monopoly, demands of a city an unreasonable price for gas, the city may offer a reasonable price; and if the gas company refuses to furnish at that price, the city may maintain *mandamus* if the supply has not been commenced, and may sue in equity to enjoin the stoppage of a supply then being furnished. Public Service Corporation vs. American Lighting Company, 67 N. J. Eq. 122. See also, Public Service Gas Company vs. Newark, 86 N. J. Eq. 384, 388.

Jaquelin vs. Erie Railroad, 69 N. J. Eq. 432, is relied upon by defendant because there Vice-Chancellor Garrison refused an injunction compelling the railroad company to maintain a station, holding that the remedy was by *mandamus*, and said that the authority of courts to compel a railroad company to maintain a station where not required to do so by charter or statute was not so clear as to justify the granting of a preliminary injunction restraining the discontinuance of such a station; but at page 444 he also said that courts will compel the completion of a road if the charter clearly imposes that duty upon it, and they will also compel the operation of the road and other clear duty enjoined upon the corporation. This case would appear to be an authority for the contention of the state.

That a preliminary mandatory injunction may be issued in a proper case has the sanction of the Court of Errors and Appeals. See Bailey vs. Schnitizius, 45 N. J. Eq., 178, where it was held that a mandatory injunction was rarely granted before final hearing, and will only be ordered to prevent extreme or very serious damage. In other words, that it will be ordered in such circumstances.

That a preliminary mandatory injunction will lie in a proper case has been decided over and over again in this court. See Whitecar vs. Michenor, 37 N. J. Eq. 6; Pennsylvania Railroad vs. Kelley, 77 N. J. Eq. 129; Barna vs. Kirczow, 71 N. J. Eq. 196; 201; Savage vs. Port Reading Railroad, 73 N. J. Eq. 308; National Docks Railway vs. Pennsylvania Railroad, 54 N. J. Eq. 10; 16.

In Hodge vs. Giese, 43 N. J. Eq. 342, Vice-Chancellor Van Fleet held that a court of equity may protect legal rights in real estate where the right, though formally denied, is yet clear on facts which are not denied, and according to legal rules which are well settled, and the injury against which protection is asked is irreparable; that an injury is irreparable which is material, and which cannot adequately be redressed by pecuniary damages; that contrary to the general rule, a mandatory injunction may issue at the inception of a suit for the protection of an easement and other rights of like nature.

The important question is, May this court lay a public utility corporation under a mandatory injunction to operate its works for the benefit of the public where to do so would appear to entail a loss upon the company. The only cases in this state which I have found that bear upon the question are Public Service Corporation vs. American Lighting Company, and Public Service Gas Company vs. Newark, supra; and there the question was as to a reasonable price for gas, and it was held that injunctions would issue to compel the companies to serve the public with gas for lighting at a reasonable price where the companies demanded more. But in Georgia and New York it has been held that a utility corporation could be compelled to serve the public even if that service would be unprofitable.

In Savannah, &c. Co. vs. Shuman, 91 Ga., 400, the court held that so long as the corporation retains its franchise it will not be allowed to urge as an excuse for failing to perform any duty required of it by its charter that service would be unprofitable. It cannot consistently keep the franchise and reason that such performance would be unremunerative. And in People vs. New York Central & H. R. R., 28 Hun (N. Y.) 543, the court said that the question was, Could a railroad corporation refuse or neglect to perform its public duties upon a controversy with its employees over the cost and expense of doing them; that the question admitted of but one answer, that the excuse had no validity in law; that the duties imposed must be discharged at whatever cost; that they could not be laid down or abandoned or suspended without the legally expressed consent of the state; that the trusts were active, potential and imperative and must be executed until lawfully surrendered.

After all, that is the test. The duty resting upon a quasi public corporation must be performed or its privileges and franchises must be surrendered. It cannot assume to discharge its duty to the public on and off, as it may find it profitable to do so. And this apparently has the sanction of the Supreme Court of the United States, for in Brooks-Scanlon Company vs. Railroad Commission of Louisiana, 251 U. S. 396, 64 Law ed., 323, at page 326, that court, while holding that a carrier cannot be compelled to carry on business at a loss (a question of fact which doubtless concerns the Public Utility Commission and the Supreme Court on *mandamus*), nevertheless observed that "it is true that if a railroad continues to exercise the power conferred upon it by a charter from the state, the state may require it to fulfill an obligation imposed by the charter, even though fulfillment in that particular may cause a loss." And that is the point I make, for, it seems to me, on an application for injunction to restore the status, it is not for me to make an exhaustive investigation of facts, and to adjudicate whether or not the company could be operated at a profit, but that it is enough if it appears that it is obliged to operate under a charter which it has not surrendered. See, also, Atlantic C. L. R. Co. vs. N. C. Corp. Com., 206 U. S. 1, at page 26.

The condition with which the court is dealing is appalling. I have never known anything like it to exist in this state. To say that in its presence there is no court competent to give needed prompt relief, is to assert that there is a defect in the law itself. If the defendant can cease to operate its lines for the benefit of the public under a charter which requires it to do so (which charter it sought and received), then the great steam railroads, even the transcontinental roads, can do so, and thus paralyze transportation business over a wide territory, to the untold loss and inconvenience of a suffering public.

Now, in order to grant relief admittedly the damage must be extreme and serious; it must be material and irreparable. It is all these and more. It is not an answer to say that the company cannot operate at a profit, and therefore it should not be obliged to run at all. The answer to that answer is: It stands still at a loss, and if it stands still long enough it will be absolutely ruined. This would ultimately result in an insolvency receiver, who would be directed to operate the road under order of the court.

Such an ending would be disastrous to those owning the bonds and stock of the company and to its other creditors, unless the property at receiver's sale brought sufficient to discharge all its obligations in full, which is not likely. No one hopes more than I do that that calamity will never befall this great corporation with its numerous security holders. Nor do I think that ordering operation will have that effect. I think, on the contrary, that the effect will be to stimulate negotiations to settle the many difficulties with which the company is confronted. But, be that as it may, I think it my duty to order the injunction prayed for to restore the *status quo ante* in aid of the suits at law.

If the injunction were not obeyed then it appears the informant would be entitled to the appointment of a receiver, under the general equity powers of the court, to carry out its mandate by operating the road. See Stockton vs. Central Railroad, 50 N. J. Eq. 489. And the attorney general could make an application to that end.

It should be stated in closing that the defendant objects that the informant is not entitled to relief in this court respecting the matters set forth in the information, and prays the same benefit and advantage as though it had moved to strike out the information in conformity with the present practice substituted for demurrer. The views which I have above expressed lead to a denial of this application.

Mandatory injunction accordingly.

The various orders of the court follow in part:

In Chancery of New Jersey.

In the matter of the application for a receiver for Public Service Railroad Company, by A. Henry Kollmar, Petitioner.	On Petition, &c. **Opinion.**

1. An application for the appointment of a receiver under the general railroad act, *Comp. Stat. 4219, sec. 86*, is not a proceeding before the Chancel-

lor as a statutory magistrate or legislative agent, but is a proceeding in the Court of Chancery itself.

2. Under a prayer for further or other relief, or without it according to the present rule of court, petitioner may have such relief as he shows himself to be entitled, without a specific prayer therefor.

3. On application for a receiver under the statute, to operate a railroad for the benefit of the public, where the railroad has ceased to run any car for a period of ten days, and the facts and circumstances warrant it, the court may, under its general jurisdiction, issue a mandatory injunction compelling the company to operate, with leave to petitioner to apply for a receiver under the general equity powers of the court in case the injunction is disobeyed.

On application for appointment of a receiver for Public Service Railroad Company.

THOMAS F. MCCRAN, *attorney general, and* WILLIAM NEWCORN, *assistant attorney general,* for petitioner.

ROBERT H. MCCARTER, FRANK BERGEN, MERRITT LANE, E. AMBLER ARMSTRONG *and* WILLIAM H. SPEER, *contra.*

WALKER, *Chancellor.*

This is an application for the appointment of a receiver for a trolley line organized under the general railroad act, Comp. Stat. 4219. The power invoked is that residing in section 86 of the act, which provides that if any railroad company has failed or neglected to run daily trains on any part of its road for ten days, the Chancellor, on petition of any citizen of this state, and on due proof of the facts, may appoint a receiver who shall take possession of all the property of the company and operate its road and transact the ordinary business thereof in the transportation of freight and passengers for such time as the Chancellor may direct.

The case is before me on petition and affidavits and answer and affidavits. It is conceded that the road has not operated since Aug. 1, 1923; and defendant asserts that it has always been operated at a loss, which is not denied.

The petition prays for the appointment of a receiver and for further and other relief. The court is therefore not obliged to grant or deny the relief specifically prayed, but can give any measure of relief to which in its judgment the petitioner is entitled.

I do not feel willing to appoint a receiver in this matter in the facts and circumstances before me, and have concluded under the prayer for further and other relief to grant a mandatory injunction compelling the defendant company to operate its road, the same as in McCran, attorney general, vs. Public Service Railway, and for the reasons stated in that case, with the alternative that if the mandate to operate is not obeyed, a receiver may be applied for. as in that case, under the general equity powers of the court. This course I deem much fairer to the defendant company, and it will also avoid any doubt as to the validity of section 86, which has been questioned by the defendant, and concerning which the Court of Errors and Appeals suggested difficulty in Long Branch S. S. R.R. Co., 26 N. J. Eq. 539, at page 540.

As the Public Service Railroad has always been operated by the Public Service Railway, since the latter acquired the former, operation of its own road by the Public Service Railway will facilitate operation of the Public Service Railroad.

Mandatory injunction accordingly.

NEW JERSEY, to wit: *The State of New Jersey to Public Service Railroad Company, Greeting*:

Whereas, it hath been represented to us, in our Court of Chancery, on the part of A. Henry Kollmar, petitioner, that he has lately exhibited a petition pursuant to the statute made and provided against you, the said Public Service Railroad Company, Defendant, to be relieved touching the matters set forth in the said Petition.

We, therefore, in consideration of the premises and of the particular matters set forth in the said petition do strictly enjoin and command you, the said Public Service Railroad Company under the penalty that may fall thereon, that you forthwith resume the operation of your railroad system and furnish adequate and proper service as a public utility to the citizens of the State of New Jersey until our said Court shall make other order to the contrary.

Witness, his Honor, Edwin Robert Walker, our Chancellor, at Trenton, the eighteenth day of September, in the Year of Our Lord one thousand nine hundred and twenty-three.

..............................,
Attorney-General of New Jersey,
Solicitor of the Petitioner.

.........................,
Clerk.

In Chancery of New Jersey.

In the Matter of the Petition for a Receiver for the Public Service Railway Company, by A. HENRY KOLLMAR, Petitioner.	**On Petition.** Order that a Mandatory Injunction Issue.

Thomas F. McCran, attorney general of the state of New Jersey, having filed a petition for and in behalf of A. Henry Kollmar, a citizen of the state of New Jersey, praying for the appointment of a receiver to operate the railroad for the defendant for the benefit of the public, and for further or other relief, pursuant to the statute made and provided, and an order to show cause having been issued, and the matter coming on to be heard in the presence of Thomas F. McCran, attorney general, and William Newcorn, assistant attorney general, solicitor and of counsel with the petitioner, and Robert H. McCarter, Frank Bergen, Merritt Lane, E. Ambler Armstrong, and William H. Speer, solicitors and of counsel for the defendant, and the court having read and filed the petition and affidavits attached thereto, and the answer and answering affidavits annexed thereto, of the defendant and listened to the argument of counsel pro and contra, and having duly considered the same, and it appearing to the court that the defendant has ceased to run any cars for a period of more than ten days, and to discharge its duty as a public utility for the benefit of the public, and that a mandatory injunction should issue compelling the defendant company to operate its road;

It is, thereupon, on this eighteenth day of September, A.D. nineteen hundred and twenty-three, on motion of William Newcorn, assistant attorney general, solicitor and of counsel with the petitioner, *ordered* that the State's Writ of Mandatory Injunction be issued forthwith, directed to the Public Service Railroad Company, commanding that it forthwith resume the operation of its railroad system, and furnish adequate and proper service as a public utility to the citizens of the state of New Jersey.

In Chancery of New Jersey.

Between THOMAS F. MCGRAN, attorney general of the State of New Jersey, for and in behalf of the State of New Jersey, Informant, and PUBLIC SERVICE RAILWAY COMPANY, a corporation, Defendant.	**On Information.** Order that a Mandatory Injunction Issue.

Thomas F. McCran, attorney general of the state of New Jersey, having filed an information for and in behalf of the state of New Jersey, praying that a mandatory injunction be issued, directed to the Public Service Railway Company commanding it that it forthwith resume the operation of its railway, or, in the alternative upon the continued refusal to operate and discharge its duty to the public as a public utility that a receiver be appointed to operate the same until the final determination of the actions at law now pending, and an order to show cause having been issued, and the matter having come on to be heard, and the court having read and filed the information and the affidavits annexed thereto, of the defendant, and listened to the argument of counsel pro and contra, and having duly considered the same, and it appearing to the court that the *status quo ante* should be maintained in aid of the actions at law now pending, in order to prevent irreparable damage and injury, and that a mandatory injunction should be issued;

It is thereupon, on this eighteenth day of September, A.D. nineteen hundred and twenty-three, upon motion of William Newcorn, assistant attorney general, solicitor and of counsel with the informant, *ordered* that the State's Writ of Mandatory Injunction be issued forwith, directed to the Public Service Railway Company, commanding that it forthwith resume the operation of its trolley cars over its railway system, and furnish adequate and proper service as a public utility to the citizens of the State of New Jersey until the determination of the actions at law now pending in the New Jersey Supreme Court.

Financial and Corporate

Monthly Deficits Increase

Cincinnati Traction Unable to Meet Added Burden of Higher Wages—Fares Increased

Deficits in the operating expenses of the Cincinnati Traction Company for July and August will result in an increase in fares from 7½ to 8 cents on Oct. 1. Formal announcement of the proposed increase was made on Sept. 15, when the company proceeded to advertise it, according to law.

A financial statement of the company shows a deficit of $38,990 for July and $68,685 for August. The award of the board of arbitrators announced on Aug. 11, granting the company's 1,700 employees increases in wages from 3 to 7 cents an hour, is directly responsible for the increase in fares, according to Walter Draper, vice-president. After the increase goes into effect it will be of no advantage to passengers to buy tickets as the cost of a single ticket will be the same as a cash fare. It is possible that the traction company will do away with the ticket system.

Under the terms of the service-at-cost franchise the railway is required to raise its fares after a deficit occurs in its operating expenses for two consecutive months. The ordinance also specifies that the company must advertise its intention fifteen days before the date fares are to be increased. Fares have been at 7½ cents since late in the summer of 1921, when the City Council passed an ordinance relieving the traction company of payment of its franchise tax of $380,000 to the city. The ordinance was passed because the 7½-cent fare was not producing enough revenue for the traction company to meet its operating expenses and pay the franchise tax. In other words the city surrendered the tax money due it from the traction company to permit fares to remain at 7½ cents. It is possible that before the end of this year fares will reach 8½ cents, which level they topped in April, 1920, shortly before W. C. Culkins, former Director of Street Railroads, enjoined the railway from increasing its fare to 9 cents. The 8½-cent fare was the largest paid by the car-riding public in the history of street railway service in Cincinnati. Prior to October, 1918, the 5-cent fare was in vogue for many years. In that month, which was in the war period, the traction company served notice of an increase in fares on Jan. 1. 1919. On that day it was increased to 5½ cents and kept increasing ½ cent every three months until April, 1920.

On Aug. 16, following the announcement of the award of the arbitrators in the wage controversy between the traction company and its employees, W. Kesley Schoepf, president, said in a statement that drastic measures would have to be taken to reduce expenditures to keep the rate of fare at 7½ cents. Since that time the traction company has made reductions and has practiced economy in all its undertakings, but the additional burden is too large to offset without impairing the service.

The $250,000 in additional charges brought about by the arbiters' agreement means an increase of approximately $22,000 a month in the operating expenses of the traction company. By increasing the rate of fare at this time, the ordinance deferring the payment of the franchise tax to the city becomes void and the company must earn enough money out of the 8-cent fare to meet this charge.

The traction company has introduced one-man cars on many of its routes since the announcement of the award of the board of arbitrators and this measure has helped to some extent to relieve the situation.

Excess Profits Tax Discussed

Can a railway which is operated under a service-at-cost franchise with a provision that it can pay its stockholders no more than 6 per cent return on their investment ever be subject to an excess profits tax?

This is the issue involved in the attempt of the Cleveland Railway to prevent the Federal government from collecting the sum of $405,992 from it for income and excess profits taxes for the years 1917 to 1920, inclusive.

A hearing on the issue was held in Washington on Sept. 11. The company was represented by former United States Senator Atlee Pomerene, Attorney Fielder Sanders, former city street railway commissioner, and Attorney Harry J. Crawford. These attorneys contended that instead of the railway owing the Federal government any income or excess profits taxes, the Federal government really owes the Cleveland Railway $175,000 for taxes already collected for the years 1921 and 1922.

Outlining the operation of the Tayler plan in Cleveland, Mr. Pomerene contended that inasmuch as not more than 6 per cent return could ever be paid the stockholders, the company never could make anything that could properly be taxed under an income or excess profits tax because all earnings over and above 6 per cent went into the fare stabilizing fund and acted to reduce the rate of fare paid by the car riders.

Attorney Crawford in the opening argument said:

> While this appears to be a controversy between the Cleveland Railway and the Federal government, it is ultimately a controversy between the city of Cleveland and the Federal government. We operate in Cleveland on the service-at-cost basis with a definite, fixed return to the holders of the stock.
>
> To say that the company owes the government money as excess profits is absurd, because the company cannot have excess profits under the Tayler plan ordinance. If the profits raise the amount in the interest fund above $500,000, the money is held in trust for the people of Cleveland. It is returned to them in the form of reduced fares or increased service.

At the conclusion of the hearing Kingman Brewster, who presided over the government committee on appeals and review, declared that the case presented "new questions" because of the form of the contract between the city of Cleveland and the railway.

Deficit in July in Toledo

Operations for the month of July by the Community Traction Company, Toledo, resulted in a deficit of $36,483, which after a credit for interest earned on cash resulted in a charge of $35,969 to the fare stabilizing fund, bringing it down to a balance of $150,368. Decrease in revenue passengers amounting to almost 10,000 daily as compared with the previous month, higher wages, large maintenance program and settlement of a large damage claim are factors which went to make up the big loss for the month. The prospect is that the August deficit will be considerably less.

Bus operations on Oak and Erie Streets feeder lines still result in a loss, but business has improved on the Oak extension.

The ratio of operating expense to gross income was 86.925 per cent. This is the highest experienced since July, 1921.

The maintenance program for the month involved an expenditure of more than $65,000 and was the largest for any month in the history of the company.

The Council has finally refused to take advantage of the clause in the Milner ordinance by which it would have demanded $1,000,000 of new capital from the Doherty interests for financing improvements.

Railway Assessment Advances

According to figures recently published by the Tennessee Railroad & Public Utilities Commission, the assessments of public utilities in the state have increased approximately $9,000,000 in 1923 over the 1921 biennial assessment. For 1923 the street railway assessment was $32,264,250, against $31,877,963 in 1921. There was no change in the assessment of the Citizens' Railway & Light Company, the Knoxville Railway & Light Company, Memphis Street Railway and Nashville Railway & Light Company. In the Jackson Railway & Light Company there was a tentative assessment made of $788,000. In 1921 this figure was $368,065. Another change was a reduction in the assessment of the Memphis & Lakeview Railway, from $122,100 in 1921 to a total assessment of $88,500 in 1923.

Amendment to Increase Stock.—The Kentucky Utilities Company, Louisville, has filed an amendment increasing its capital stock from $5,000,000 to $10,000,000.

Resolutions Passed for Bond Issue.—The South Jacksonville, Fla., Council passed resolutions to have the bond issue for the municipally-owned car line printed and advertised for sale at once. The amount of the issue will be $100,000.

Auction Sales in New York.—At the public auction rooms in New York there were sold on Sept. 19 thirty-five shares of Columbus, Marion & Bucyrus Railway, $10 lot, and 1,000 shares of Manhattan Transit Company, $90 lot.

Initial Preferred Dividend Declared.—The Monongahela-West Penn Public Service Company, Pittsburgh, Pa., has declared an initial dividend of 43¾ cents on the 7 per cent preferred stock, payable on Oct. 1 to stock of record Sept. 15.

Common Stock Dividend Declared.—The Board of Directors of the Bangor Railway & Electric Company Bangor, Me., declared a quarterly dividend on common stock amounting to 1 per cent. The dividend is payable to stockholders of record on Oct. 10.

Prior Lien Stock Offered.—The Chicago, North Shore & Milwaukee Railroad is offering to its stockholders and the public $1,500,000 of 7 per cent prior lien stock. The proceeds will be used to pay indebtedness incurred and for additional working capital.

Line Shuts Down.—The Hamilton & Dundas Electric Railway is now in the hands of receivers. The line was closed by the Dominion Power & Transmission Company on Sept. 7. It had been in operation for about forty-five years and was one of the oldest short lines in Canada and one of the oldest electric lines. Bus and jitney traffic put it out of business.

Will Resume Service.—According to a recent announcement by the New York Transit Commission the Union Railway has accepted the recent order of the commission to resume service on that portion of its Morris Park Avenue surface line between Bronxdale Avenue and Williamsbridge Road, the Bronx, which has been closed since 1916. The portion of the line to be restored is approximately ½ mile in length and will serve a community of more than 1,200 persons, many of whom now have to walk more than a half mile to the nearest transportation point.

Wants Dividend Payments.—Seeking to recover $1,249,956 in dividends alleged to be owed to him and other stockholders of the Eastern Massachusetts Street Railway, L. Sherman Adams of Wellsley has filed a bill in equity in the Supreme Court against the company and against Arthur G. Wadleigh of Lynn, Fred J. Crowley of Lowell, Isaac Sprague of Wellsley, Earl P. Charlton of Fall River and Samuel W. McCall of Winchester, its public trustees.

Order Entered for Railway Sale.—An order has just been entered in the Henry County Circuit Court for the sale of the property of the Galesburg & Kewanee Electric Railway, Kewanee, Ill., as an entirety. This line operates the interurban between Galva and Kewanee and the city cars in Kewanee. This order came following an application by the company. Attorney John T. Cummings of Kewanee has been appointed special master in chancery to make the sale, which will be made some time in October, and will take place in front of the Henry County Courthouse at Cambridge.

Tracks Will Be Ordered Torn Up.—All car tracks in Tiffin except those used for interurban traffic by the Tiffin & Fostoria Railway will be ordered torn up. This was the City Council's reply to the company's offer to move its tracks from a business to a residence street in order to restore city service. Legislation ordering the tracks removed will be started right away and the city will fight its stand through the courts if the company contests the order. If this ultimatum is carried out it will leave the company with rails only in West Perry Street, four blocks on East Perry Street and a spur in Jefferson Street. The company would be forced to dispose of its freight depot in the south end of the city.

Merger of Subsidiaries Proposed.—The New York Transit Commission has approved the petition of the South Brooklyn Railroad for permission to acquire the outstanding capital stock of the Prospect Park & South Brooklyn Railroad and the New York & Coney Island Railroad. The South Brooklyn Company is controlled by the Brooklyn-Manhattan Transit Corporation, the successor to the Brooklyn Rapid Transit Company, and is the lessee of the other companies. In its petition, the South Brooklyn Company disclosed that it is proposed to buy the required outstanding stock at $112 a share.

Seeks Abandonment.—The Aurora, Plainfield & Joliet Railway has petitioned the Illinois Commerce Commission for permission to abandon its road between Joliet and Aurora. The competition of buses is assigned as the reason by the railway for its desire to junk the line. The line began operating in 1904, and profits were shown every year until 1911, when dividends were suspended and efforts were required to keep the road running without incurring deficits. Vice-President Winston stated that the petition for suspension was filed on the basis of a Supreme Court decision which held that no company could be compelled to operate a business at a loss.

New Connecticut Road Elects Officers.—W. Scott Eames, general manager of the New Haven Trap Rock Company, was elected president of the New Haven & Shore Line Railway at a stockholders' meeting on Sept. 12. A. William Sperry was chosen vice-president, Frederic E. Kingston was named treasurer and Leonard O. Ritter was elected secretary. A board of directors made up of Clarence Blakeslee, David S. Walton, Jr., Charles M. Walker, Donald A. Dunham of Hartford, Philip J. Stueck, Middletown; Robert B. Lively, Clinton; Frederick C. Spencer, Guilford; Arthur W. Chambers, Frederick N. Sperry, A. William Sperry, W. Scott Eames and Frederic E. Kingston were elected at the same time. As noted previously in the ELECTRIC RAILWAY JOURNAL the company is operating a rehabilitated electric railway out of New Haven, Conn.

Conspectus of Indexes for Sept., 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Sept. 1923 **7.00**	Aug. 1923 **6.92**	Sept. 1922 **7.01**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Aug. 1923 **165**	July 1923 **169**	Aug. 1922 **189**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Sept. 1923 **215**	Aug. 1923 **214**	Sept. 1922 **208**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Aug. 31 1923 **5.41**	July 31 1923 **5.91**	Aug. 31 1922 **5.95**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Aug. 1923 **13.90**	July 1923 **14.69**	Aug. 1922 **12.92**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures **Number** **Liabilities (millions)**	Aug. 1923 **1,433** **48.40**	July 1923 **1,406** **36.53**	Aug. 1922 **1,675** **36.89**	Jan. 1922 **2,722** **105.7**	May 1923 **1,467** **31.77**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Sept. 1923 **221.5**	Aug. 1923 **221.5**	Sept. 1922 **185.0**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Aug. 1923 **150**	July 1923 **151**	Aug. 1922 **155**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913 = 9.21	Sept. 1 1923 **12.91**	Aug. 1 1923 **12.82**	Sept. 1 1922 **12.08**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's — Wholesale Commodities 1913 = 120.9	Sept. 1 1923 **188.0**	Aug. 1 1923 **186.7**	Sept. 1 1922 **172.5**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Aug. 1923 **146**	July 1923 **147**	Aug. 1922 **139**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Aug. 1923 **161.6**	July 1923 **161.9**	Aug. 1922 **154.5**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Traffic and Transportation

Court Upholds Commission

California Body Ruled to Be Right in Fixing Different Basis for Local and Interurban Fares

Action of the Railroad Commission of California in fixing interurban railway fares upon a different basis from local passenger fares for street car service has been upheld by the California Supreme Court in a decision in litigation involving Pacific Electric Railway fares between Los Angeles and Pasadena, South Pasadena, Alhambra and Glendale.

The decision clearly establishes for the first time the correctness of the theory used by the Railroad Commission in fixing interurban fares on a mileage basis as distinct from local fares which are fixed on the basis of the average ride per passenger, without regard to the distance traveled within the local fare zone by the individual passenger.

DOES NOT VIOLATE CONSTITUTION

The Supreme Court in its decision, rendered by the court *en banc*, holds that neither the order of the Railroad Commission nor the tariff schedule filed pursuant to the provision thereof violates the provisions of Section 21 of Article XII of the State Constitution.

As pointed out by the court, in its decision, the commission established local passenger fares, dividing Los Angeles proper into two zones, and fixing a fare of 6 cents for the inner zone, and 6 cents for the outer zone, or a through fare for the two zones of 10 cents.

The reasonableness of these zone rates was not questioned, the court pointed out, they being fixed on the basis of the average distance all the passengers ride, the individual passenger paying the prescribed fare regardless of the distance he rides in the prescribed zone.

The rates of fares on the interurban service were fixed upon a mileage basis, to and from Los Angeles, being calculated from the Los Angeles terminal stations of the company. The general one-way fare for all interurban passenger service was fixed at 2.75 cents per mile, and the reasonableness of this rate is not questioned, the court pointed out.

In the suit brought by the cities of Pasadena, South Pasadena, Alhambra and Glendale, it was alleged that inasmuch as the sum of the local passenger fares (in case a passenger would ride to Sierra Vista, the outer edge of the outer zone from Los Angeles, for 10 cents, and then could board another car and ride to Pasadena for another fare of 10 cents, or 20 cents for the entire trip), was lower than the interurban rate of 29 cents for a through trip, without change to Pasadena, that the tariff violated the provisions of the state constitution prohibiting discrimination against passengers and places using the same character of service.

The Supreme Court points out that this is exactly where the petitioners failed to prove the rates discriminatory, as there is a distinction between the interurban service and the local service, the interurban trains being operated on separate tracks from the local service, and the interurban service being by means of larger and heavier cars and operated at high speed, with more, and more comfortable seats than the local service provides.

The court points out that there were no decisions to which it might refer for precedents in deciding this litigation, and that it had recourse to the decisions of the Interstate Commerce Commission, and also that it is strengthened in its decision by the wording of the State Constitution, Section 21, of Article XII, which specifically provides that there shall be no discrimination between places or persons "or in the facilities for the transportation of the same classes of freight or passengers within this state."

"It is manifest," the court observes, "that an interurban passenger, who pays a fare depending upon the exact distance he rides, is not in the 'same class of passengers' as the local passenger, who may ride one block, or 5 miles, for the same fare."

Survey of Houston Conditions Under Way

Speeding up cars of the Houston Electric Company will reduce operating costs and improve service, it is declared by J. A. Beeler, New York, employed by the city of Houston. The company's prime contention in its petition, filed in Federal court, seeking relief from what it alleged to be confiscatory fares imposed by the city, was that it is losing money.

The average speed for cars in Houston is 6 m.p.h., Mr. Beeler said. The system is fairly efficient and furnishes service that compares favorably with the service given in other cities, but big savings can be made in several instances, the traction expert said. By rerouting and speeding up cars the company will be able to please its patrons, render more efficient service and effect a material saving in the cost of operation.

Reduction in the number of stops on all lines is the first recommendation toward speeding up service. Houston has sixteen stops for the mile, Mr. Beeler said, while an average of eight stops should be sufficient.

Before any rerouting can be determined upon it will be necessary to make a complete survey of the transportation needs of the city, and a corps of men is now engaged in checking the service on all lines. The report will be digested and put in such form that it can be used in court.

The trial of the company's suit in Federal court is set for Sept. 24.

Freight Handling Discussed

D. U. R. Will Install New System for Expediting Freight—Officials Approve

The new system for handling freight soon to be installed by the Detroit United Railway on its lines in Michigan and Ohio, with a view to solving difficulties now encountered by electric and steam railways, manufacturers and other shippers, was discussed at a meeting of railway officials at the office of the Detroit United Railway on Sept. 13. Officials of the Michigan roads and also officials of some of the Ohio, Illinois and Indiana railways were present. Large containers to be equipped to fit upon a motor truck and a flat car are provided for by the system which in the opinion of officials of the Detroit United Railway will result in a considerable saving of time by reducing the number of times the freight is handled from twelve times to approximately seven.

Truck lines are to be established as feeders for the electric lines by the Detroit United Railway to compete with the truck lines operating from Detroit to Michigan cities and to Cleveland and Toledo. It is pointed out that the proposed plan for competition with the truck lines will result in a considerable change in railway equipment, including construction of special flat cars and the building of stands for unloading the trucks directly onto the cars.

Special waterproof containers resembling large boxes will be furnished to shippers in the factory of the shipper and picked up by the specially-built trucks operated by the company for delivery to the nearest point on the electric line. When the container is unloaded from the car it will be again picked up and delivered at the plant or store of the receiver.

The use of flat cars will be possible in connection with the containers with the resulting reduction in the weight of the load. By using the engine of the truck to haul the containers onto the chassis and unload it again, the company will be able to dispense with a number of freight handlers. It is estimated that only 50 per cent of the time now consumed in loading and unloading freight will be required when the containers are used. With the use of the containers it is anticipated that shippers will save considerable time and the company considerable money by avoiding claims for damages to freight and freight stolen in transit. The present arrangement whereby the freight is packed loosely in a freight car and the car sealed will be replaced by the use of the container, which can be moved to any part of the factory or warehouse to be packed securely and sealed for shipment. Closer contact between the company and the farmers as well as the manufacturers is expected by the use of the new system as containers for the shipment of farm products, milk, etc., will be built.

The proposed system was approved by a number of the railway officials present and the discussion brought out the fact that a system similar to that proposed by the Detroit United Railway had been in successful operation in England for several years for the transportation of freight in London, Liverpool, Manchester and other cities. The manner in which a similar system is working out in Cuba was reviewed and moving pictures shown to illustrate how time and labor can be saved by the new arrangements.

Michigan railway development, it was cited, has not kept pace with the growth of Michigan cities and the necessity for railways for finding a system for feeding into their lines by motor trucks was emphasized.

Jitney Ouster in Effect in Birmingham

Birmingham jitneys ceased operation at midnight, Sept. 15. As a result the Birmingham Railway, Light & Power Company reduced fares on Sept. 18 to 7 cents for cash fares and 6 cents for tickets, according to the agreement with the City Commissioners some weeks ago. The fare was formerly 8 cents, while fifteen tickets were sold for $1. An additional 2 cents will be charged for transfers, either on cash or ticket fares, the same as before.

At a meeting between Assistant City Attorney W. A. Jenkins and Attorney G. J. Prosch of Prosch & Prosch, representing the Jitney Men's Association, it was agreed to request the Supreme Court to vacate an injunction of the Jitney Men's Association against the City Commissioners restraining them from putting the jitneys out of business. The injunction was therefore vacated and annulled by Associate Justice Lucien D. Gardner on Sept. 13. After appealing to the Supreme Court by the Jitney Men's Association for the reinstatement of the temporary injunction which had been dissolved by a lower court, an initiative election of the people was held and the jitneys were defeated by a vote of approximately four to one.

The fight between the city and the jitneys has been a long drawn out one. But the big majority vote against the operation of the jitneys proves conclusively that the people of Birmingham prefer the street cars to the jitneys.

The settlement of the jitney question will also settle the long-drawn-out controversy between the city and the company over the pavement of certain streets and the improvement of its system. In fact, the company has already complied with some of its agreements with the city, which depended upon the elimination of the jitney from Birmingham streets. The company has already placed in effect the Jim Crow law, required by the city, on most of its street cars.

And now that the jitney is eliminated there is a strong likelihood that the company will be reorganized and lifted from the receivership where it has been for some time. It has been the contention of the company all along that the jitney was injuring its business to such an extent that it was unable to make any progress. It was also argued by the company that it was impossible to improve the system as it was barely paying expenses, and being in the hands of a receiver money could not be borrowed for improvements and extension of the lines.

It is likely that some changes will be made in the Tidewater Street car line, as this line has never been a paying proposition owing to the fact that it operates through territory still largely unsettled.

Buses Will Supplant Cars.—As the result of a town meeting in Westport, Conn., at which a large majority of citizens voted for bus service, all the trolley tracks of the Connecticut Company, except those by which cars pass from Bridgeport to Norwalk, will be torn up. Bus service will supplant the railway service.

Fare Period Extended.—The Missouri Public Service Commission has granted a further extension of the 8-cent fare rate for the Kansas City Railways for a period of six months from Sept. 18. John B. Pew, city counselor of Kansas City, in a letter to the Missouri Public Service Commission Sept. 14 informed the board that he would not oppose the application of the receiver of the Kansas City Railway lines for an extension of the present fare for a period of one year.

Fines Imposed.—In the Supreme Court before Justice Charles E. Nichols on Sept. 8 twenty-seven jitneys drivers were cited to appear for violation of the Hinman injunction of two years ago forbidding competition with the United Traction Company. Nine drivers who failed to make their appearance either in person or by counsel are to receive "jail" sentences. Fines of $100 were imposed on two operators and the cases against a number of others were adjourned.

Transfers to Bus Line.—The New York State Railways (Oneida line) has filed a local passenger tariff approved by the Public Service Commission which provides that passengers paying Utica city zone fare or Oneida line cash fare will, upon request to the conductor, be given transfers to the Utica Railway Co-Ordinated Bus Line, Inc., for transfer at Parkway and Genesee Street. Transfers issued by said bus line will be accepted for passage on Oneida line cars.

Wants Order Changed.—The Schenectady Railway has applied to the Public Service Commission for an amendment of an existing order which requires it to carry Albany city passengers within the Albany city limits. It is alleged the United Traction Company has extended its city fare service to the Albany city line, and the Schenectady Railway alleges that there is no public reason for it carrying Albany city passengers, as service to the west city line is now given by the United Traction Company.

Bus Certificate Granted.—The Iowa Railroad Commission has granted to the Waterloo, Cedar Falls & Northern Railway a certificate permitting it to operate a bus line from Cedar Falls to Waterloo. A bus line already existing between Cedar Falls and Waterloo protested to the commission several months ago that the interurban company's line, conducted as an auxiliary to its railroad system, was not operating in good faith, at the time of the passage of the motor bus license law by the General Assembly on April 14, 1923, and that the railroad company ought therefore to be enjoined from operating the bus line.

Working for Safety and a Picnic.—The safety first campaign started by the railway employees of Keokuk has been given added impetus by Walter H. Burke, manager of the Keokuk Electric Company, who announced that the company would provide a dinner or picnic for its men if they closed a month without an accident. The men hold midnight meetings once or twice a week to discuss the safety campaign, safety slogans appear on all cars each day and motorists and pedestrians have caught the spirit and are doing all they can to prevent an accident involving personal injury during the month.

Will Petition for Bus Permit.—The stockholders of the Sheridan Railway, Sheridan, Wyo., will petition the State Utilities Commission for permission to operate buses in the city. The railway was not making money and when the city decided to repave the streets the assessment against the tramway was more than it could pay, so it petitioned the commission for permission to cease operation of the railway. This was granted and the next step will be the petition to operate a bus line within the city. The cessation of the railway service within the city of Sheridan will not affect the electric line between Sheridan and Fort MacKenzie.

Council Rules One-Man Cars to Stay.—The City Commission of Dayton, Ohio, has rejected the repeal petition submitted by the Central Labor Council officials, requesting the abolition of one-man cars in Dayton. The action was taken at the close of a public meeting. Following this action of the Council, the Labor Council officials announced that they would file with the Board of Elections petitions signed by 25 per cent of the voters and force the one-man car issue to a decision at the polls in November. Before the issue can come to a vote, over the city commission's objections, it will be necessary for the labor committee to secure an additional 15 per cent of the votes of Dayton.

Personal Items

Indiana Man in New Post

Hudson R. Biery Becomes Assistant to President Charles L. Henry of the Indianapolis-Cincinnati Line

Hudson R. Biery, as noted briefly in the ELECTRIC RAILWAY JOURNAL for Sept. 15, has tendered his resignation as purchasing agent for the Union Traction Company of Indiana, Anderson, Ind., effective on Oct. 1. He will become associated with Charles L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company, as assistant to the president. This company is in the midst of a program of complete rehabilitation, which will be concluded during the spring and summer of 1924.

H. R. Biery

Mr. Biery's electric railway experience began in 1908. In that year he entered the service of the Indianapolis & Louisville Traction Company at Scottsburgh, Ind., the original 1,200-volt d.c. line recently acquired by the Interstate Public Service Company. He was employed at first as storekeeper. Later he was made clerk to the superintendent, then traffic manager and purchasing agent in 1911. Following the receivership of the property in 1915, Mr. Biery continued with the Indianapolis & Louisville Traction Company as assistant to John E. Greeley, president and general manager, in charge of transportation. He resigned this office in 1919, when he was made purchasing agent for the Union Traction Company of Indiana. His successor with the Union Traction Company has not yet been appointed.

Changes in West Penn Property

E. A. Morgan, who has been superintendent of the West Penn Electric Company, Wellsburg, W. Va., has been transferred to the same position at Weirton, W. Va., and M. J. Zurick, who has held a similar position at Charleroi, Pa., will go to Wellsburg. J. S. Johnson, who has been general superintendent of the territory, will be transferred to the treasury department and will give his time to the sale of West Penn securities in Brooke, Ohio, and Hancock counties.

W. S. Eames Heads Rehabilitated Road

W. Scott Eames has been elected president of the New Haven & Shore Line Railway, New Haven, Conn., which recently took over and restored to service a part of the old Shore Line Electric Railway. Mr. Eames is very well known throughout Connecticut. For more than five years he was Director of Public Works in New Haven under the late Mayor Frank Rice. He retired from that office because of press of business in other lines in which he was interested. At present he is general manager of and director in the New Haven Trap Rock Corporation, the largest concern of its kind in New England. Mr. Eames was elected head of the National Crushed Stone Association of the United States two years ago. He is also one of the moving spirits in the B. B. Savage Company and the New Haven Upholstery Company. He is treasurer of the Totoket Electric Company. He is a member of the Union League Club and other social and fraternal organizations and is prominent in Masonic circles.

W. B. Carson, formerly secretary of the Pittsburgh & Beaver Street Railway, is now vice-president. The office of secretary is being filled by A. W. Washabaugh.

Milton E. Ailes, a well-known Atlanta newspaper man, has been appointed by the Georgia Railway & Power Company a member of the public relations department for the company. Mr. Ailes has, for the past fourteen years, been connected with the Associated Press in charge of the bureau at Memphis and at Atlanta.

Rev. Francis A. Chancellor Stone, who for thirty-five years served on the "L" lines of the Brooklyn-Manhattan Transit Company, has severed his connection with the railway to devote his entire time to the ministry. Up to a year ago Mr. Stone had a regular run as motorman on the Broadway or Lexington Avenue "L" lines. He devoted his Sundays and other off time to preaching and his other duties as a minister. He has been active in the ministry since 1901, when he was ordained in the Congregational Church. He was well known throughout Brooklyn as "The Railroad Evangelist." On Aug. 1, 1923, he became a member of the company's Service Honor Legion.

Mr. Baehr to Manage Merger

Well Known Consulting Engineer Is Elected Vive-President and General Manager of Combined Properties

William A. Baehr has recently been elected vice-president and general manager of the Illinois Power & Light Corporation. He will make his headquarters in Chicago, in which city are located the general offices of the new corporation, which is a consolidation of the North American Light & Power Company's properties and the Illinois Traction System.

Mr. Baehr has been active as a consulting engineer and operator of public utility properties for many years and is one of the best known utility men in the country. His first connection with public utilities was in Wisconsin. Following his graduation from the University of Wisconsin, Mr. Baehr spent three years in general engineering work and then became superintendent of distribution of the Milwaukee Gas Light Company. From this position he went to Denver as superintendent of the gas department of the Denver Gas & Electric Company. In 1903 he became chief engineer of the Laclede Gas Light Company, St. Louis.

W. A. Baehr

In 1909 he opened offices in Chicago as consulting engineer. He has been employed by many of the leading utility companies of the country in connection with the operation of properties and the construction and design of plants and on many occasions has been engaged in valuation and financing problems.

Prior to becoming the directing head of the merged corporation, Mr. Baehr occupied a similar position with the North American Light & Power Company, operating gas, electric light and power, street railways and interurban properties in Illinois and other Middle Western states. He was born in Oshkosh, Wis., on Sept. 15, 1873.

The merged company is one of the very largest earners in point of gross receipts among the utilities of the United States.

Mr. Seely in Motor Field

Former Executive at Youngstown Joins Yellow Coach Manufacturing Company at Chicago

Garrett T. Seely has joined the forces of the Yellow Coach Manufacturing Company as its Western sales manager. Announcement to this effect has been made from the office of the company at Chicago. It will not surprise Mr. Seely's intimates to learn that the former vice-president and general manager of the Pennsylvania-Ohio Electric Company and its subsidiaries, among them the Pennsylvania-Ohio Coach Lines, Inc., has become identified with the automotive industry.

For an engineer Mr. Seely has been unusually alive to sales possibilities in the transportation field. At Youngstown he created an entirely new business by bus by supplying a public demand. His company was, in fact, the first to supplement a car line with buses to develop new interurban business. It was, indeed, a radical thing to do, to put in a line of this kind, but Mr. Seely did it. The story of the results achieved was told to the members of the Central Electric Railway Association in a paper read at Louisville on Jan. 18 and 19, 1923. There is no need to repeat any part of it here. That paper, published in the ELECTRIC RAILWAY JOURNAL for Jan. 27, page 169, not only told the story of the Youngstown installation, but tucked away in its text was the story of the talent of the man behind the move.

From the very first Mr. Seely has been a believer in the use of the bus properly articulated with the electric railway. His work at Youngstown affords striking proof of this. But his belief in the use of the bus as a feeder and in service supplementary to the electric railway is only a part of the story behind his decision to accept the Chicago appointment. The position at Chicago will afford him a greater opportunity than any purely operating position with a single railway to exercise his natural talents and his knowledge of engineering and transportation. With the Chicago company his activities will extend to the distribution, sale and installation of the company's products and, more important still to Mr. Seely, they will include the conduct by him of analysis of conditions governing future bus installations.

The record of Mr. Seely's achievements in the steam railroad and the electric railway fields has been the subject of a review recently in the ELECTRIC RAILWAY JOURNAL and is generally well known in electric railway circles.

The Yellow Coach Company has already drawn liberally on the electric railway industry for transportation talent, and in inducing Mr. Seely to join its forces has indirectly paid that industry another very great compliment. There is no excuse for the application of the cut and try method when talent is available that can unearth the facts needed to prevent what might turn out to be costly errors. This the Yellow Coach Company has realized from the first. Its appointment of Mr. Seely is further evidence of its desire to round out its personnel so as to include the most expert construction, selling and transportation engineering knowledge.

W. P. Strandborg to Manage Bureau

Portland Man Chosen to Direct Publicity Work for Public Utility Companies in Oregon

Another little job more or less means absolutely nothing to William P. Strandborg, publicity and advertising man of the Portland Railway, Light & Power Company, Portland, Ore. So when the public utility men of Oregon got together recently and decided that they needed a permanent bureau of publicity through which to tell their story to the public the members unanimously decided that Bill, as he is familiarly known, should direct the bureau. Bill accepted. He has never been known to duck anything. Just when he does his work is a mystery, but he does it.

W. P. Strandborg

While carrying on for the Portland company and editing *Watt's Watt* Bill finds time to act as president of the Public Utilities Advertising Association, and to be an active figure in the civic life of Portland, managing community chests and doing other odd jobs that require the kind of writing that brings in the money. Many Portlanders are the owners of securities of the Portland Railway, Light & Power Company, and it is Bill's copy with its purchase-producing urge that has made a hugh success of the issues sold locally at Portland for cash or on partial payments.

Bill was graduated from Western Reserve University, Cleveland, Ohio. At the time he was graduated Bill probably could not have answered correctly all questions Mr. Edison might propound, but being unconscious of that then it did not stifle in him the urge to write and he served on the *Plain Dealer* and the *Press* in Cleveland. In 1903 he went to the Pacific Coast as editor of the Seattle *Star* and later was special writer on the *Evening Telegram*, Portland, Ore. There he won great popularity with the newspaper-reading public for his whimsicalities. That was some time before the vogue of the column conductor, which fate Bill apparently escaped because President Griffith of the Portland company, who had just taken over that office, was able to win Bill over along about 1915 to his way of thinking about the local utility. There Bill has been ever since, chaffing the public of Portland to laugh with him at some of their own foibles, building up good will for his company and selling to the thrifty issues of stock and bonds that pay liberal returns on the investment and doubtless have saved thousands of local dollars from the maw of the get-rich-quick promoter.

If there is anybody in Portland that really counts that doesn't know Bill it is not Bill's fault. Among the organizations of which he is a member are the Portland Ad Club, Portland Press Club, Portland Automobile Club, Progressive Business Men's Club, Portland Transportation Club and the Elks, to mention just a few. He also founded the local chapter of the Ancient Order of Muts. For a number of years he was vice-president of the Associated Advertising Clubs of the World for the Pacific Coast.

Charles S. Kressler has been elected president and general manager of the Saginaw Transit Company, the successor to the Saginaw-Bay City Railway, under which railway service is to be resumed in Saginaw soon in accordance with the terms of the settlement franchise passed recently. Mr. Kressler has been engaged in public utility work for ten years, of which seven have been with electric railways.

Obituary

Samuel Edward Young, former general manager of the Johnstown Passenger Railway, now the Johnstown Traction Company, died recently at his home in Johnstown, Pa., at the age of seventy-four years. He was made assistant general manager of the railway in 1892 and a short time later general manager, retiring three years ago.

Henry W. Harris, associate editor of the "Stone & Webster Journal," died suddenly upon the golf links at Marion, Mass., Sept. 9. Mr. Harris was born in 1871 at Flushing, L. I. He was graduated from Yale University in 1895. He entered the public utility industry about nine years ago and was on the staff of the Northern Texas Traction Company, Fort Worth, Tex., from 1914 to 1921. He went to the Boston office of Stone & Webster, Inc., about two years ago and for most of that time was engaged in editorial work.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Industrial Standardization Progresses

Reduction Has Been Made in Variety of Sizes Available in Many Lines of Manufactured Products

Definite progress in the movement to eliminate waste in industry is being made in a number of important lines, according to a bulletin just issued by the Chamber of Commerce of the United States. The bulletin states that industry is no longer thinking of simplification and standardization as activities which may stifle initiative or interfere with service to the trade. No confusion can result if it is kept clearly in mind that the objective is the elimination of waste, which is today obstructing industrial progress.

Forty or fifty manufacturers, jobbers, retailers, consumers of paints and varnishes have adopted a simplification program. This action will reduce the varieties of containers used in marketing the commodities and also will eliminate many colors and shades of paints, stains, enamels and varnishes. The adopted schedule is substantially the same as that drawn up for wartime operation. The action taken is to become effective Dec. 31, 1923.

A general conference of asphalt producers, together with road commissioners, state, municipal and highway engineers was able to reduce the varieties of asphalt grades from 102 to 10. Certain definite penetration limits were established for paving asphalt, sheet asphalt and block filler. This simplification is to be put into effect on Jan. 1, 1924.

CONFERENCE DECIDES BRICK SIZES

Not until a survey had been made was it very generally realized the multiplicity of sizes for brick. If any commodity should be standardized dimensionally it is building brick. This has been accomplished by a conference of clay brick manufacturers, engineers, builders and other interested elements. Two sizes of face brick have been retained and one for common brick. The face brick sizes are: Rough brick, 8 x 2½ x 3¾; smooth brick, 8 x 2½ x 3⅞. For common brick the standard size is 8 x 2½ x 3¾.

Another outstanding simplification program was adopted at a meeting of retail dealers, users, and manufacturers representing 85 per cent of the wire fence production. Sizes, types and varieties of wire fence were reduced from 552 to 69. This action carried with it a reduction of fence packages from 2,072 to 138. The simplified schedule became effective Sept. 1, 1923, for new production, and stocks of discontinued lines are to be cleared by Jan. 1, 1924.

Discusses Readjustment of Freight Rates

The question of freight rates was made the subject of discussion at a recent meeting of the Chamber of Commerce in Washington at which were present representatives of the agricultural, manufacturing, labor and transportation interests constituting the rates committee designated by the chamber. The rates were discussed looking toward a readjustment rather than a reduction. F. A. Delano, former member of the Federal Reserve Board and now chairman of the rates committee, stressed this point when he said that it was a matter of readjusting rates to eliminate inequalities in relative rates.

Overhead Contract in Morocco Let

The contract for the equipment of the overhead section of the line from Casablanca to Kourigha, Morocco, by the "suspension catenaire" system, has been given to the Compagnie d'Enterprises Hydrauliques et de Travaux Publics of Paris on behalf of the Compagnie des Chemins de Fer du Maroc. Only within these last days, following upon the French occupation of Morocco but a dozen years ago, have standard gage railway lines been in operation, an outgrowth of the narrow gage *automotrice* (gasoline - motor) lines which connected Casablanca with Rabat and Rabat with Mekenes, Fez and Taza. The result was that the automobile came to be the preferred form of locomotion, indeed the only efficient and rapid means of communication, public service vehicles being as numerous as privately owned cars. A big step forward has been taken under the ægis of Marechal Lyauty, the real founder and animator of Morocco, by the electrification of one of the first portions of the rail lines of narrow gage recently transformed to standard.

Brazil Orders for England

The English Electric Company has secured a contract for the electrification of the Campos do Jordao Railway in Brazil. The contract, which has been awarded by the government of São Paulo, covers the conversion of an existing meter-gage railway, including the supply and erection of about 30 miles of overhead catenary construction for use with 1,500-volt d.c., 15 miles of 30,000-volt, three-phase transmission line, motor coaches for passenger and freight service and the building and equipment of a substation. At the substation the 30,000-volt, fifty-cycle supply will be transformed and converted to direct current at 1,500 volts for the working conductors. Each passenger coach will seat forty passengers, and each freight car will carry 10 tons. The electrical equipment per coach will be four D. K. 30 self-ventilated traction motors, wound for 750 volts. The motors are connected two in series and the two pairs operate in series-parallel. Two-thirds of the railway is on gradients, the steepest of which is 10.5 per cent. The motor coaches are accordingly to be fitted with four brakes—hand, air, rheostatic and electro-magnetic track brakes.

Consolidated Car Heating Company Handles All Heating and Ventilating Equipment

As was announced in the ELECTRIC RAILWAY JOURNAL of Sept. 15, the Automatic Ventilator, formerly manufactured and sold by the Automatic Ventilator Company of New York, has been taken over by the Consolidated Car Heating Company. By adding this equipment to its line of electric car heaters and thermostats the Consolidated Car Heating Company is now in a position to handle the entire heating and ventilating requirements for any design of car.

The Automatic Ventilator has been on the market for many years. It is perhaps best known in the steam railroad field, where it is standard equipment on the passenger cars of a number of leading railroads. Railway mail cars have been very largely equipped with the Automatic Ventilator because it so adequately meets the rigid ventilator specifications of the United States Post Office Department.

The Automatic Ventilator is said to be a self-acting combined intake and exhaust ventilator, performing the dual function of drawing in the proper amount of fresh air and exhausting the used air, without creating draughts or troublesome air currents.

Metal, Coal and Material Prices

Metals—New York	Sept. 18, 1923
Copper, electrolytic, cents per lb	13.437
Copper wire base, cents per lb	16.00
Lead, cents per lb	6.925
Zinc, cents per lb	6.75
Tin, Straits, cents per lb	41.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.05
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	2.25
Franklin, Ill., screenings, Chicago, net tons	1.55
Central, Ill., screenings, Chicago, net tons	1.175
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.75
Weatherproof wire base, N. Y., cents per lb.	18.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.375
Turpentine, (bbl. lots), N. Y., per gal	$0.99

Rolling Stock

Knoxville Power & Light Company, Knoxville, Tenn., will purchase, it is reported, fourteen cars of the most modern type. It is said that the order will specify seven single-truck cars and seven double-truck cars.

Androscoggin & Kennebec Railway, Lewiston, Me., has placed in service the five new cars purchased from the Wason Manufacturing Company of Springfield. They are double-truck cars of Birney type construction with four G. E. 258 C motors and Westinghouse DH 16 air compressors. These cars were substituted on a car for car basis for the old double-truck two-man cars. One-man operation was started Sept. 1.

Chicago North Shore & Milwaukee Railroad recently changed the order on five passenger coaches under construction in the plant of the Cincinnati Car Company to have them finished as parlor cars of the very attractive type described in the Electric Railway Journal for July 14, 1923. The cost of the five parlor cars will be about $3,500 in excess of the cost equipped as coaches. Inasmuch as these cars were purchased on a car trust plan which had been all arranged, it would have been quite a lot of trouble to revise and increase the trust agreement and so the excess cost was charged to the railway's advertising appropriation — an operating expense. This was considered fair and practical because the first parlor cars in use had been of the greatest advertising value and had attracted much new patronage.

Long Island Railroad, New York, N. Y., has announced that it intends to purchase new equipment costing approximately $2,863,000. The equipment authorized by the management consists of sixty steel motor passenger cars for electric service, five large passenger locomotives for heavy express trains, five heavy freight locomotives and two hundred gondola or open top cars for general use. Contracts for the new equipment will be placed not later than Oct. 15. This is the 1924 car and locomotive program and assures delivery of all the new equipment in ample time for the 1924 summer traffic. With the ninety-two additional steel passenger cars ordered for 1923 delivery and the sixty now to be placed on order, and deducting eighty wooden cars of the older type that have been retired, the passenger equipment will total 1,282 cars at the end of 1924.

Track and Line

New York State Railways, Syracuse, N. Y., will extend the Court Street line one-half mile to the new Onondaga pottery plant. Materials have been ordered which will cost between $20,000 and $25,000.

El Paso Electric Railway plans to relay its loop around Oregon Street. Alves Dixson, superintendent of the company's traffic department, estimates the cost at $50,000. The new rails will be much heavier than those now in use in order to provide for the heavy traffic now passing over the loop.

Arkansas Central Power Company, Little Rock, Ark., is reconstructing the tracks on East Fourteenth Street from Scott to College Street.

Northern Texas Traction Company, Fort Worth, Tex., has been granted franchises to construct the Riverside and Sycamore Heights car lines in the city of Fort Worth. Work has begun on both lines and it is expected that the work will be completed in about two months. Construction of these two lines will represent an outlay of about $150,000.

Power Houses, Shops and Buildings

Lake Superior District Power Company, Ashland, Wis., plans the erection of a brick carhouse at Ironwood as one of the steps in the rehabilitation program.

Androscoggin & Kennebec Railway, Lewiston, Me., has recently installed an automatic arc welding equipment at the Lewiston shop. In the spring the company placed four substations on a semi-automatic basis of operation, having already one full automatic substation.

Trade Notes

Peter Smith Heater Company, Detroit, Mich., has moved its factory from the old location on Mount Elliott Avenue to new and modern quarters at 6209 Hamilton Avenue.

J. D. Phillips has been appointed office manager of the new Oakland, Cal., plant of the General Electric Company. Mr. Phillips, who was formerly traveling auditor, will have charge of accounting, statistics, payrolls and all clerical operations at these works.

Dayton Mechanical Tie Company, Dayton, Ohio, announces the appointment of G. H. Jameson to its field forces. Mr. Jameson was associated for six years with the Indianapolis Switch & Frog Company as welding engineer. Through this connection he became an authority on track construction.

Metropolitan-Vickers Electrical Company, London, received the order for the motors for 100 cars recently awarded by the London County Council. Altogether motors for 200 cars were ordered. A reference to this order appeared on page 279 of the issue of this paper for Aug. 18, but the name of the manufacturing company receiving the motor order for the other 100 cars only was mentioned.

Benjamin F. Thomas, Jr., since 1917 mechanical engineer of the United Railways, St. Louis, resigns that position to become affiliated with the engineering sales force of the Economy Electric Devices Company, general distributor of Economy meters, with offices in Chicago. His most recent work with the United Railways has been the conducting and analyzing of tests to determine the economic feasibility of installing Economy watt-hour meters in St. Louis street cars. He had charge of installing the meters and organizing a new department to handle the work and has worked up considerable original data as to energy consumption figures, which were printed in the Electric Railway Journal of Sept. 1, 1923. Previous to his association with the United Railways, Mr. Thomas was affiliated with the Electric Company of Missouri, Webster Groves, Mo., 1915-1916, and with the General Storage Battery Company in the capacity of secretary and treasurer from 1916 to 1917. Mr. Thomas is a graduate of St. Louis University, where he received the degree of bachelor of arts in 1910 and later the degree of master of arts in 1912, following which he attended the Massachusetts Institute of Technology and received the degree of bachelor of science in electrical engineering in 1913. He is a member of the St. Louis Section, A. I. E. E.

New Advertising Literature

Detroit Hoist & Machine Company, Detroit, Mich., has issued Catalog 23E on "Electric Hoists."

Irving Iron Works Company, Long Island City, N. Y., has issued catalog 4-A 92 describing the safety, comfort and durability at competitive cost of the Irving subway grating.

Reliance Electric & Engineering Company, Cleveland, Ohio, has issued bulletin No. 5018 descriptive of a new line of polyphase induction motors of the squirrel-cage type which the company manufactures.

Crouse-Hinds Company, Syracuse, N. Y., has issued a pamphlet on "Switches and Plug Receptacle Housings." The pamphlet illustrates various types of plug receptacle housings, waterproof housings and condulet fittings for them.

Motorbloc Corporation, Philadelphia, Pa., has issued Bulletin S-101, describing and illustrating the application of the Motorbloc in several capacities which have been developed as the result of eighteen years' experience in the material handling field. A tabulation of capacities, speeds, weights and electric motor sizes is given on page 3.

Hisey-Wolf Machine Company Cincinnati, Ohio, has issued a thirty-two-page miniature catalogue, No. 3027, which briefly describes the complete line (112 different sizes and types) of Hisey products. This has been prepared principally for its dealers and agents, who know the value and necessity of placing complete, condensed and practical information in the hands of all customers and prospects.

PEACOCK STAFFLESS BRAKES

meet every requirement for modern cars

More and more, you've noticed how ***Peacock Staffles Brakes*** are being specified on recent orders for modern cars —both single and double-truck types. There's a reason— several reasons in fact, and all of them good ones.

Here they are:—

1. Braking Power

Unusually powerful—an average man can develop 1066 lbs. braking power with a 16-inch hand-wheel and nearly 2000 lbs. with a 20-inch hand-wheel.

2. Chain-winding capacity

Almost no limit to the chain that can be taken up on the big drum of the Peacock Staffless. Neither slack nor worn brake shoes can prevent effective operation.

3. Quick-acting

Peacock Staffless Brakes are capable of very rapid application. Will stop the car in shortest possible time under emergency conditions.

4. Save platform space

The steel housing projects only 3¼ inches from the dash into the vestibule.

5. Economical to maintain

It's worth while to install Peacock Brakes anyhow, because in addition to being most powerful, reliable and adequate for all emergency service, they require the least maintenance. Rugged and simple with all working parts well-protected, they will last indefinitely without attention. Graphite bronze bushings on hand-wheel bearings eliminate need for lubrication.

Specify them on your next car order

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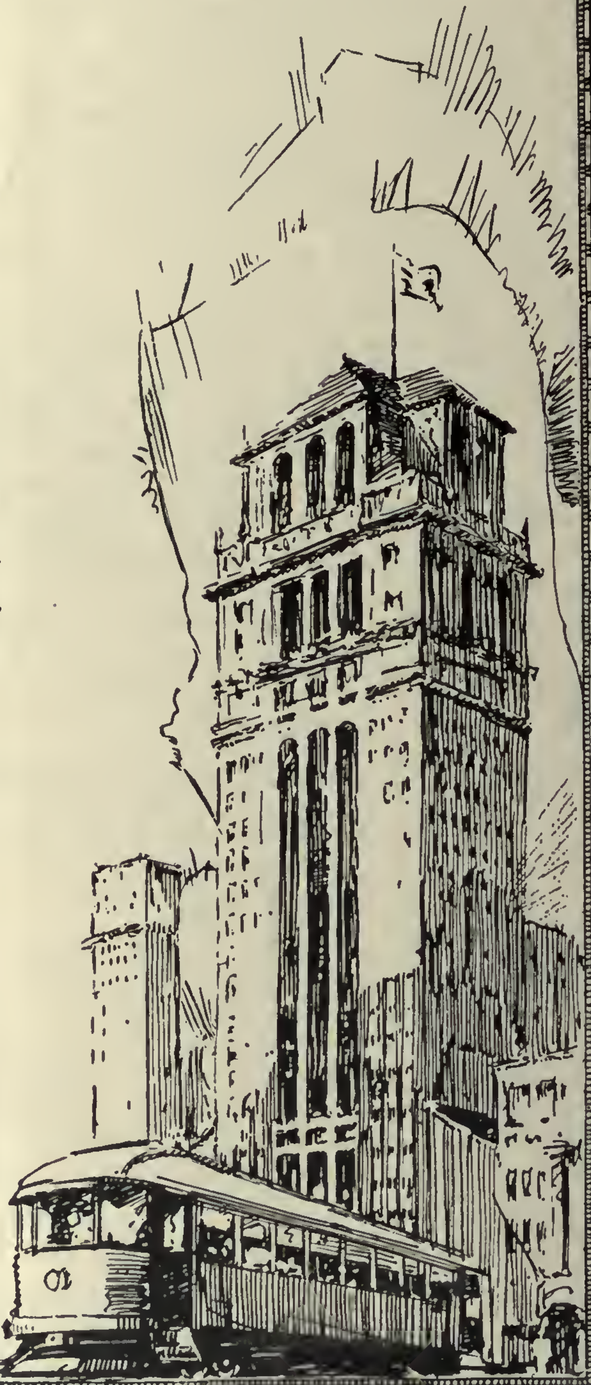

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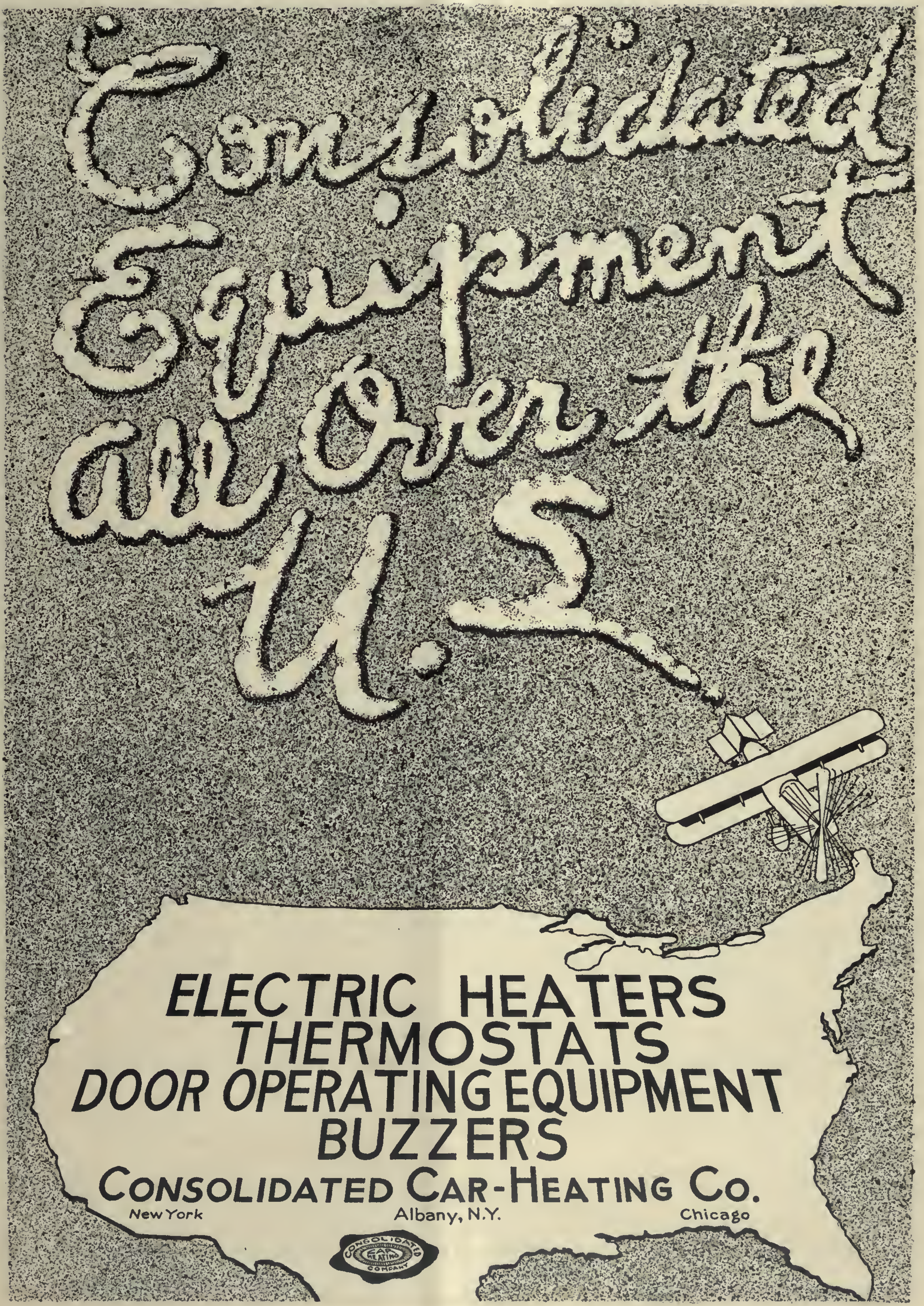

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Traction executives will be interested in a booklet, "Stopping Payroll Losses," which is sent gratis on request. Please address Dept. D-4.

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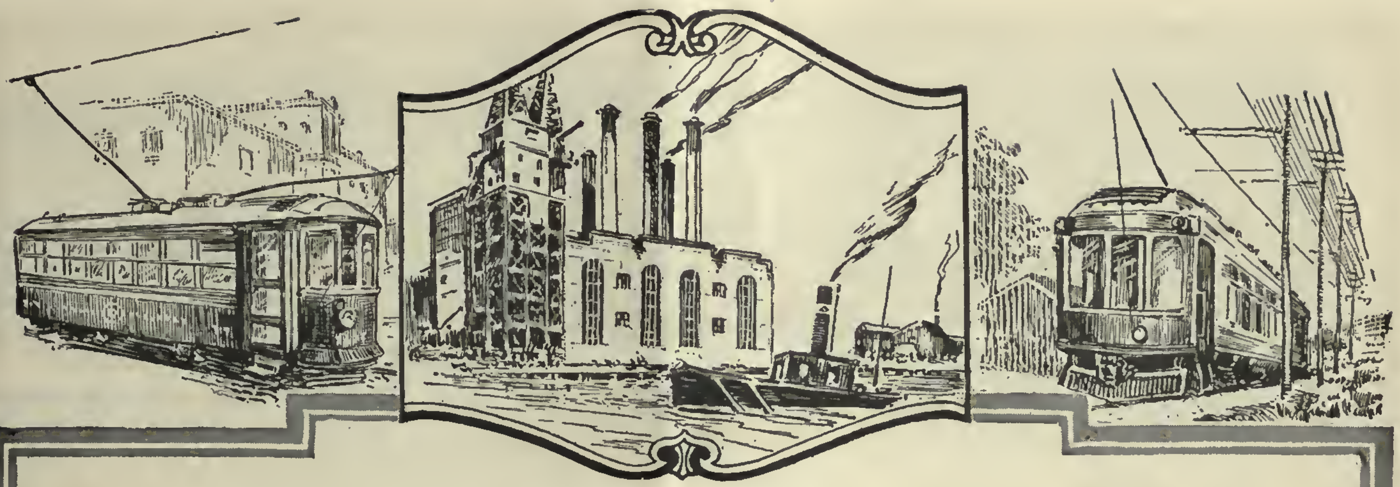

MARK TWAIN SAID:

"Everybody talks about the weather, but nobody does anything about it."

May be so in most cases, but Texaco has done something about one phase of it, anyway.

To overcome weather conditions, we manufacture certain of our street railway lubricants in two grades—one grade for cold weather; one for summer.

* * * *

There is good reason for this.

All oils tend to become a little thicker—a little sluggish in cold weather.

Now, fluidity of all oil is expressed in terms of Viscosity. Vis. varies with temperature. In the application of lubricants to street cars it is the operating temperature that counts. As the weather gets colder, the oils you used all summer will thicken. They will not then feed as freely. You can't change the temperature, but you can change the oils to compensate.

But weather doesn't change at a given date, so here's what we recommend:

Compensate gradually. About the middle of October begin adding steadily small quantities of LIGHTER oils to the lubricants now on the cars. This will gradually lower the Vis., keeping it normal all the time as winter comes.

So, now is the time to begin changing over to

TEXACO WINTER ELECTRIC CAR OIL
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Then all the time, even in the middle of winter, you will be fully protected by these carefully refined Texaco Lubricants.*

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As conditions vary throughout the country, watch the Thermometer more than the Calendar—and you will not be caught off-guard.

We have worked out an interesting and economical technique on roads all over the country and we will consider it a privilege to have our Texaco Lubrication Engineers discuss it with you in person.

There is a Texaco Lubricant for every purpose—for rolling stock, or power plant—everywhere along the line.

*In spring, reverse the process, gradually raising the Initial Vis. of the lubricants so that, under the heat of summer, the oils will "fall back" to their proper fluidity.

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These light steel cars, of the popular one-man two-man type were recently delivered to the Ontario Railway Department of the Hydro-Electric Railways for operation in Windsor, Ont.

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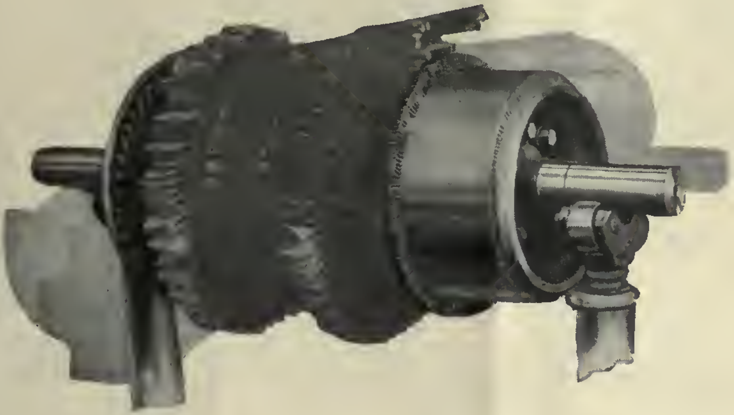
Bates engineers will gladly co-operate with you in your planning



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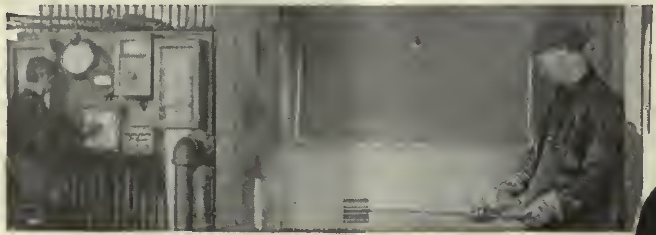

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Agents: Central Electric Co., Chicago, Ill.; Pettingell-Andrews Co., Boston, Mass.; The F. D. Lawrence Electric Co., Cincinnati, Ohio; Novelty Electric Co., Philadelphia, Pa.

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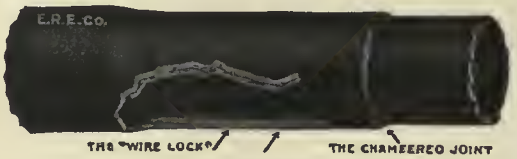

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ELECTRIC RAILWAY LUBRICATION

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An automatic dump car, an electric locomotive, a snow plow, and a freight car—all in one. Big savings shown in track construction and maintenance, paving work, coal hauling, ash disposal, snow removal, and freight transportation.

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CAR SEATS
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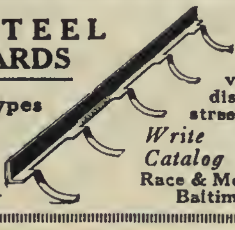

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Are forged from open hearth steel and made to fit all standard size poles.

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Type R-10

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Fit the Fare and Fare Collection System

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Unexcelled for ventilation and appearance.
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Rugged series resistance coil
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Normal welding current at half voltage

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BUCKEYE JACKS
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MAKE YOUR OWN STEEL AND IRON CASTINGS WHEN AND AS YOU NEED THEM
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Good Relaying Rails

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600 Volt—D. C.

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Railway Power Plant Equipment and Supplies

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The cost is small.

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

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Air Receivers, Aftercoolers
Ingersoll-Rand Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Elec. Service Supplies Co.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.
Axles
Bemis Car Truck Co.
Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Westinghouse E. & M. Co.
Axle Straighteners
Columbia M. W. & M. I. Co.
Babbitting Devices
Columbia M. W. & M. I. Co.
Badges and Buttons
Elec. Service Supplies Co.
Internat'l Register Co., The
Barges, Steel
American Bridge Co.
Bearings an Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Gilbert & Sons, B. F. A.
Westinghouse E. & M. Co.
Bearings Center and Roller Side
Stucki Co., A.
Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car-Heating Co.
Elec. Service Supplies Co.
Boilers
Babcock & Wilcox Co.
Bonding Apparatus
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Railway Track-Work Co.
Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-Work Co.
Westinghouse E. & M. Co.
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Johns-Pratt Co.
Brackets and Cross Arms (See also Poles, Ties Posts, etc.)
Bates Exp. Steel & Tr. Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
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National Ry. Appliance Co.
Westinghouse Tr. Br. Co.
Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
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Ackley Brake & Supply Corp.
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American Bridge Co.
Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.
Brushes, Graphite
U. S. Graphite Co.
Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Brushes, Wire Pneumatic
Ingersoll-Rand Co.
Buildings, Steel
American Bridge Co.
Buses, Motor
Brill Co., The J. G.
Bushings
National Vulcanized Fibre Co.
Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cables (See Wires and Cables)
Cambric, Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.
Carbon Brushes (See Brushes Carbon)
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Consolidated Car Heating Co.
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Electric Equipment Co.
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Coin Sorting Machines
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Connectors, Solderless
Westinghouse E. & M. Co.
Connectors, Trailer Car
Consolidated Car-Heat'g Co.
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Crossing Foundations
International Steel Tie Co.
Crossing Frog and Switch
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Wharton, Jr., & Co., Wm.
Crossing, Manganese
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Crossings, Trolley
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Crushers, Rock
Allis-Chalmers Mfg. Co.
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Morton Mfg. Co.
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Johns-Pratt Co.
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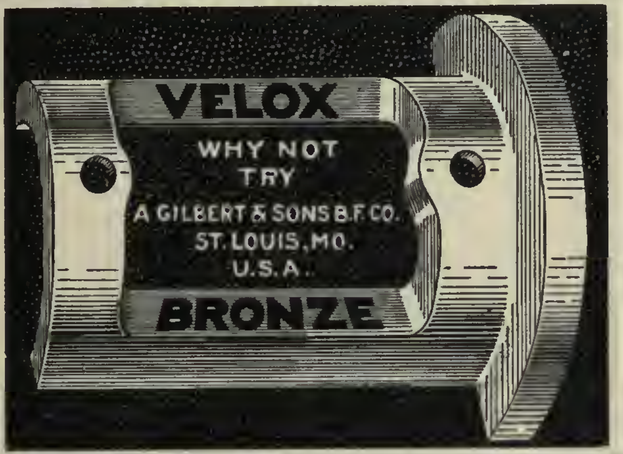

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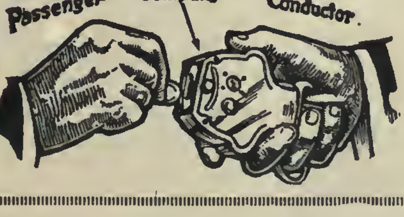

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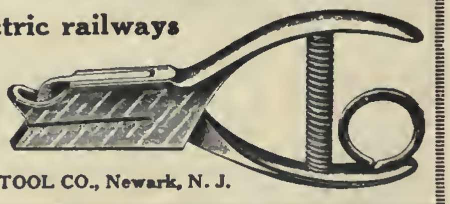

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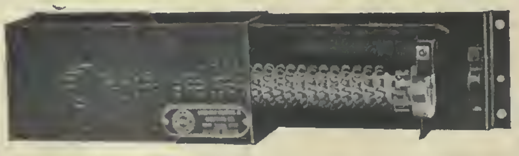

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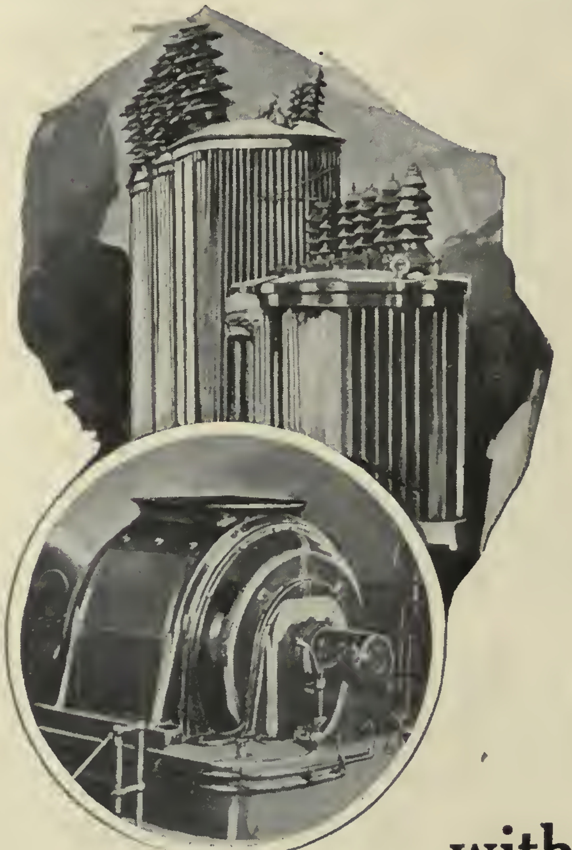

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FORD TRIBLOC

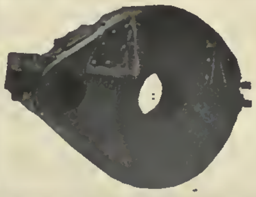
A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia

100 New Users in the Last Nine Months
KASS SAFETY TREADS
HIGH
in efficiency and lasting qualities
LOW
in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago

Northern CEDAR POLES Western
We guarantee
all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
Minneapolis, Minn.

PROVIDENCE FENDERS
H-B LIFE GUARDS
The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents



CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
Jersey City, N. J.

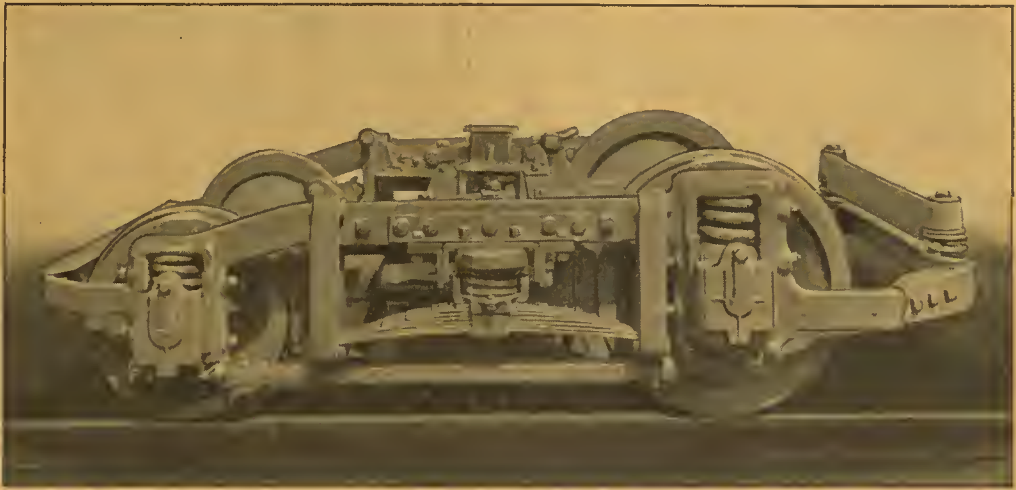
Gets Every Fare
PEREY TURNSTILES or PASSIMETERS
Use them in your Prepayment Areas and Street Cars
Perey Manufacturing Co., Inc.
30 Church Street, New York City

OXYGEN
FOR CUTTING, WELDING, ETC.
INTERNATIONAL OXYGEN COMPANY
NEWARK NEW YORK PITTSBURGH TOLEDO

STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

Brill Single-Motor Truck 39-E

This all-round city truck leads the field in number of trucks built. Its operation with but a single motor means lighter weight, lower initial cost and lower cost of upkeep of both truck and motor equipment.



Philadelphia's largest car order included 520 pairs Brill Single-Motor 39-E2 Trucks

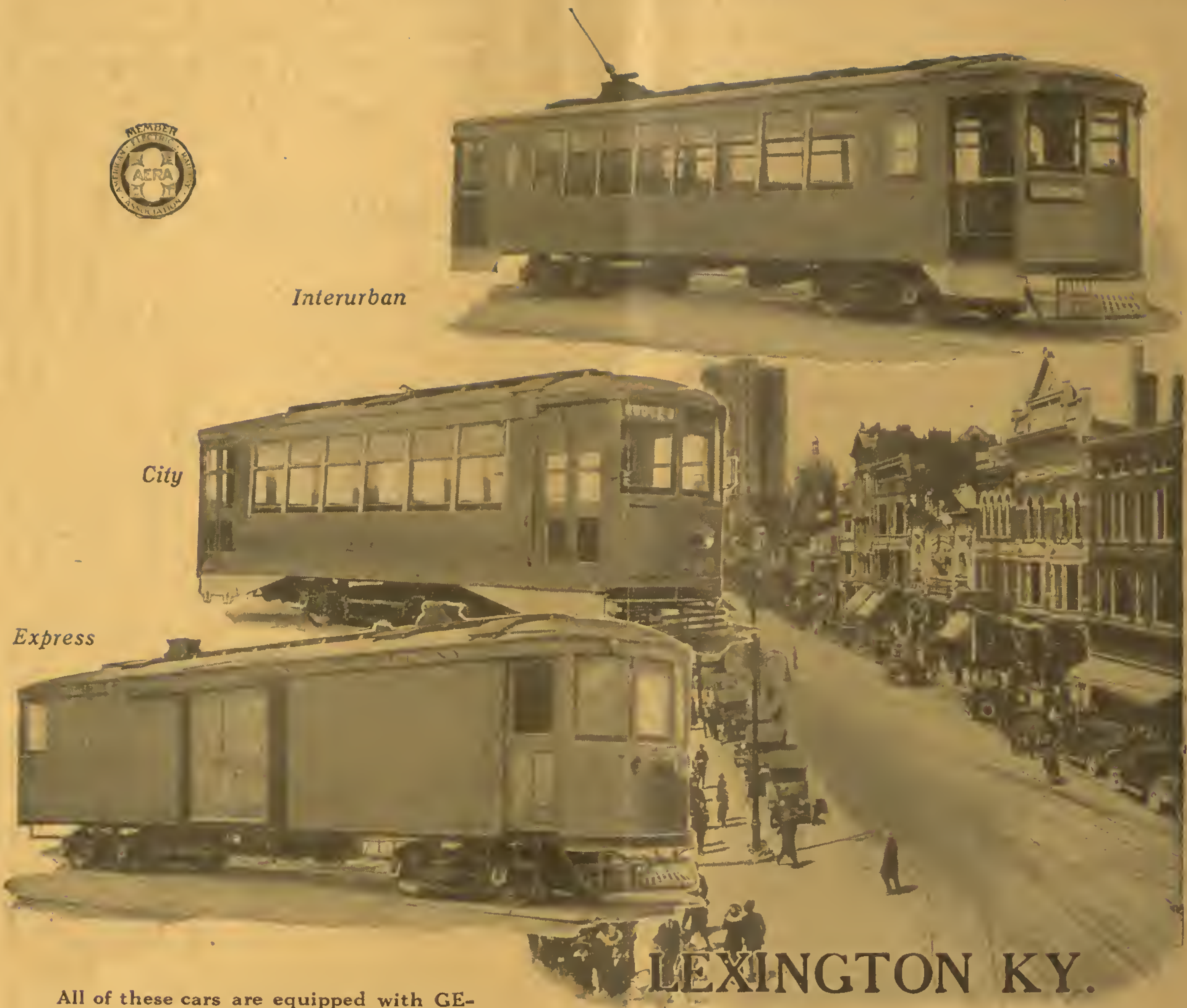
The absolute satisfaction which characterized the service rendered by this member of the Brill Truck Family in the past was, no doubt, largely responsible for its specification in the present large car order now being delivered. Introduced to Philadelphia 14 years ago, the Brill Single-Motor Truck 39-E has continued up to the present time to predominate in number over every other type truck in service.

In addition to its more economical operation with one motor, and comparatively lower cost of maintenance, the advantages of this type truck include solid-forged sideframes, which in the long run cost less to maintain, and the Brill Graduated Spring System and Bolster Guide, which are responsible for the highly improved riding action of Brill trucks.

Have you received your copy of Bulletin No. 272?

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. — G.C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.



All of these cars are equipped with GE-264-A Motors, K-Control and G-E Air Brakes, the single-truck cars having CP-25 Compressors and the double-truck cars CP-27 Compressors. The advantages of standardization, permitting the use of one type of motor, axle, wheel and other equipment, are obvious.

The first city to have all light-weight equipment

The Kentucky Traction & Terminal Company, a combined city and interurban property, has standardized on light-weight equipment and has completely replaced its rolling stock with:

12—45-Passenger, 25,000-lb. interurban cars, now commonly known as the "Lexington Car".
27—15,000-lb. single-truck city cars.
2—28,000-lb. interurban freight and express cars.

All of the new cars are operated by one man, and improved service has been given on every line.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

GENERAL ELECTRIC

25-216

McGraw-Hill Co., Inc.

50 Cents Per Copy

ANNUAL CONVENTION NUMBER

ELECTRIC RAILWAY JOURNAL

September 29, 1923

HOUSTO[illegible]
LYCEUM [illegible] CARNEGIE BRANCH
HOUSTON, TEXAS.

Each Convention sees another year added to performance records of

Phono-Electric

Trolley Wire

The Bridgeport Brass Booth will welcome many, who have learnt the lesson of "last cost first" in trolley wire. They know that Phono-Electric is eventually cheapest because it lasts longest.

Many a ten—fifteen-year old installation of Phono-Electric has yet to be replaced.

Come and see us on the Pier,
Space No. 149.

Bridgeport Brass Company
Bridgeport Connecticut

"Bridgeport"

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

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All Together "Yoh-He"

Let's break the restraining elements and permit the industry to render the service the public deserves

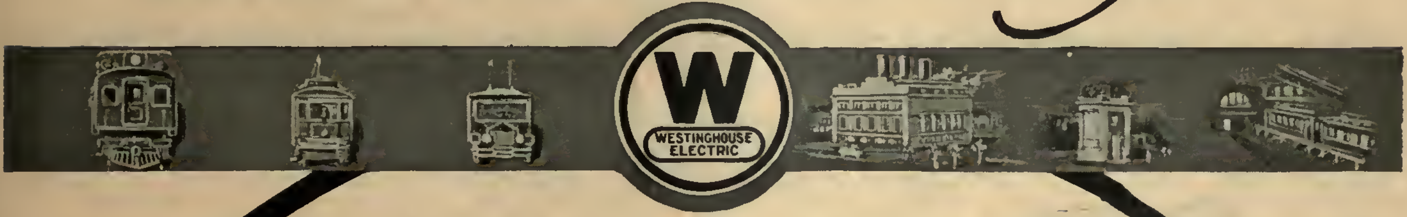
Do your part at ATLANTIC CITY

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION

Westinghouse

The Table of Contents for this issue will be found on page nineteen

Service to the Industry



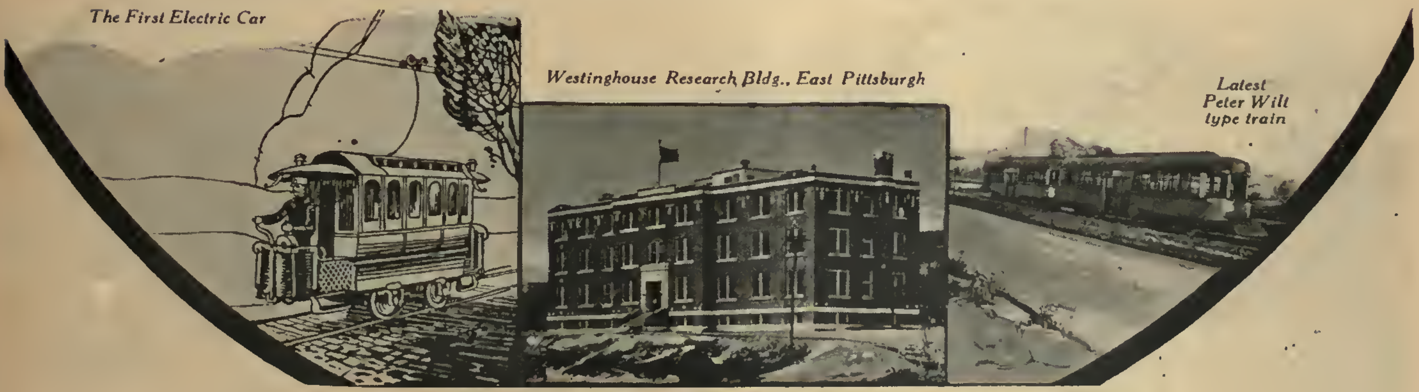
Research and Promotion

Planning for tomorrow while caring for today

After experimenting for years with the application of electricity to railway transportation, George Westinghouse in 1886 founded what is now the Westinghouse Electric and Manufacturing Company. About this same time the Electric Railway Industry was laying its corner stone. Ever since that time the Westinghouse Company has continued to invent, develop and produce apparatus to meet the demands of the ever-growing transportation industry. Westinghouse engineers are constantly analyzing industry problems on the car, in the shop, in power generation, on the line, and in the transmission and distribution systems.

Invention, development, standardization and co-operation—these are all part of Westinghouse "Service to the Industry."

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.


The First Electric Car
Westinghouse Research Bldg., East Pittsburgh
Latest Peter Witt type train

Westinghouse

Service to the Industry

No. 510-A
35 hp. Motor

No. 535
60 hp. Motor

No. 577
200 hp. Motor

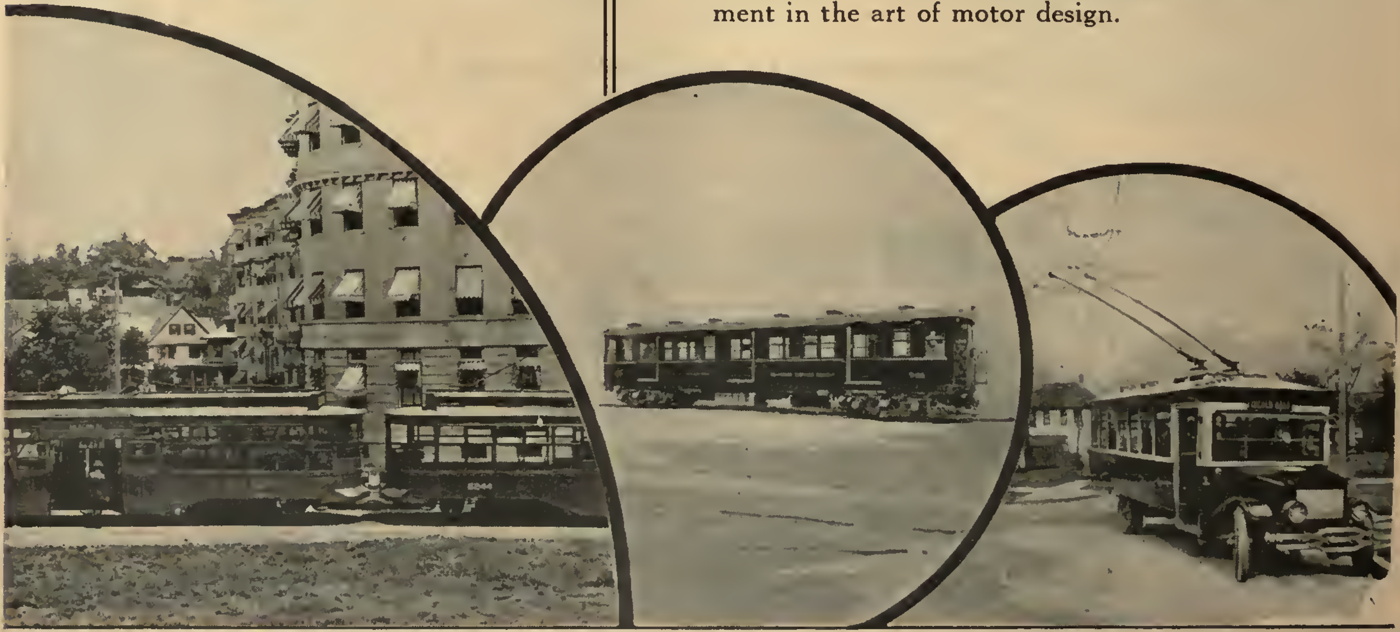
On the Car
Efficient Motor Equipment

The first successful single reduction railway motor was the Westinghouse No. 3, developed in 1891. It was the progenitor of the present practically universal type of railway motor. Since that time the Westinghouse Company has been an outstanding leader in the development and improvement of railway motor designs.

Some of the important achievements include:

The development of the first successful single reduction motor;
Introduction of the fully enclosed motor;
Application of laminated poles;
Manufacture of the first low-floor car motor;
Production of the first safety car motor;

Today there are motors available for every service, all of which embody the latest advancement in the art of motor design.



Westinghouse

Service to the Industry

On the Car

Improved Control Equipment

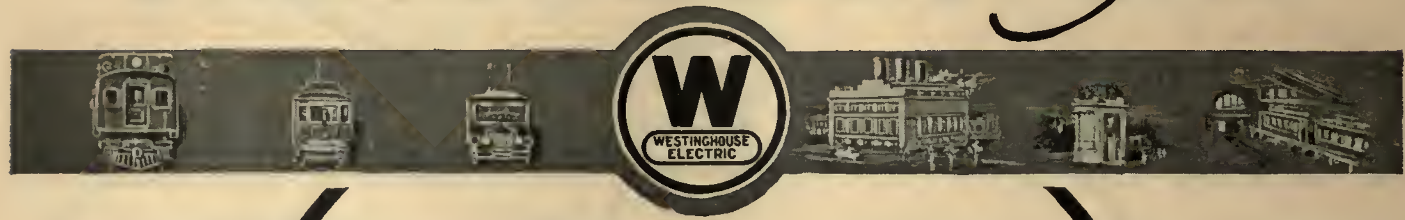
From the time of its earliest experiments with series-parallel control until its most recent developments in light and heavy traction control,—the Westinghouse Company has been a pioneer in Control Development. An outstanding development about 1898 was electro-pneumatic operated power control—which was followed in 1904 by the rectangular type unit switch control and a little later by HL control. The latter has proved to be the most extensively used train control developed to date.

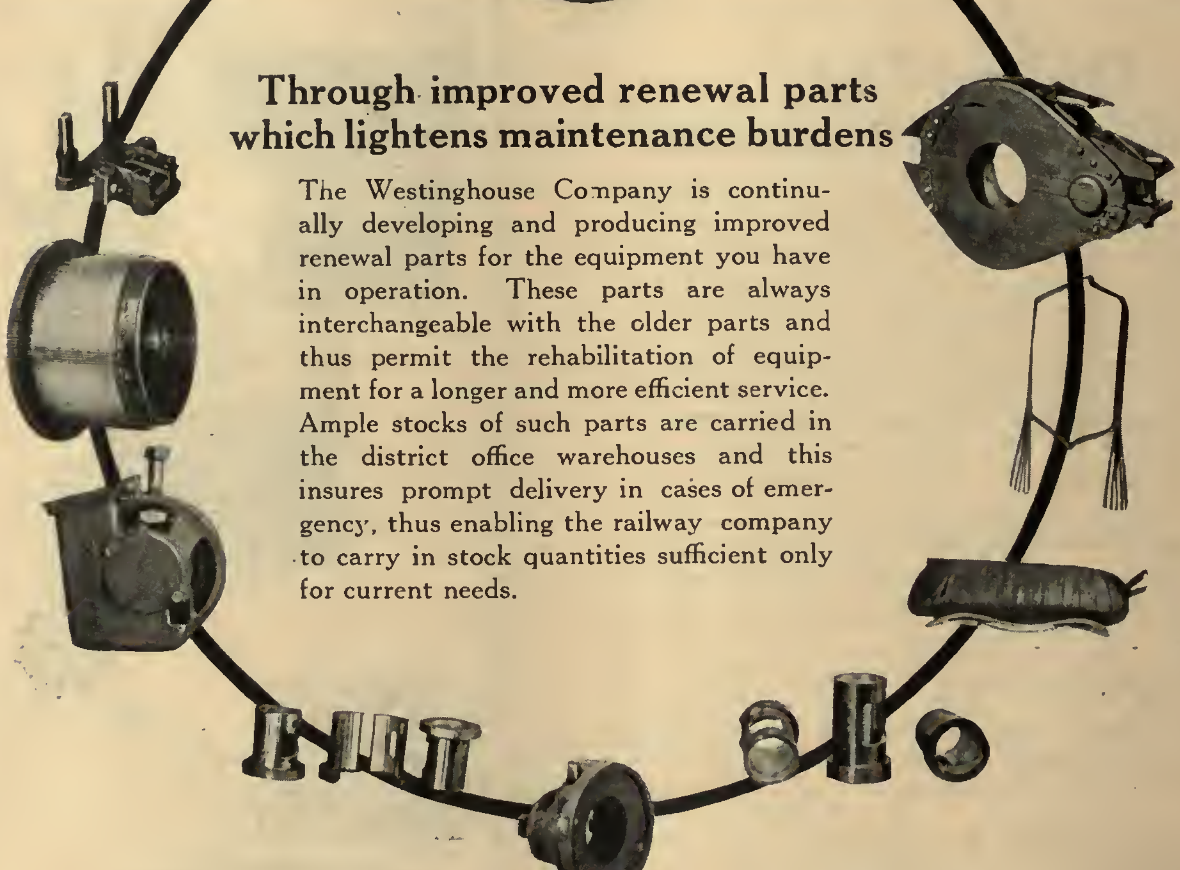
The wisdom of the early control developments is evidenced by the universal adoption today of pneumatic operation, the fundamental basis of design of the original form of controlling apparatus.

Simplicity and reliability, two important characteristics of HL control, render it suitable for light and heavy cars and locomotives; single units and train operation; high and low voltages; arge and small wheel vehicles.

Westinghouse

Service to the Industry





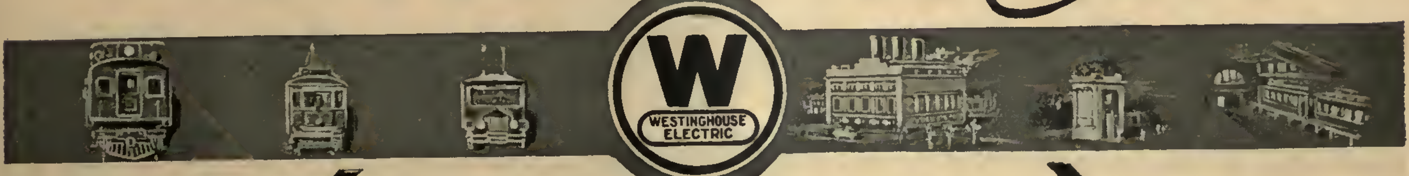
Through improved renewal parts which lightens maintenance burdens

The Westinghouse Company is continually developing and producing improved renewal parts for the equipment you have in operation. These parts are always interchangeable with the older parts and thus permit the rehabilitation of equipment for a longer and more efficient service. Ample stocks of such parts are carried in the district office warehouses and this insures prompt delivery in cases of emergency, thus enabling the railway company to carry in stock quantities sufficient only for current needs.

A trained engineering staff is available to make a study of your equipment and maintenance problems and to recommend whether best results will be obtained by retiring obsolete equipment or by rehabilitating it with improved renewal parts.

Westinghouse

Service to the Industry



In the Car Shops

The first way to reduce maintenance costs is to use apparatus that gives the longest life with the least attention. Second only in importance to this is the efficiency of your shops and the equipment used in performing necessary maintenance operations.

The life of the motor is increased by the use of high grade insulating materials and by dipping armatures and baking in an electrically heated oven. Arc welding has saved many a still serviceable part from the scrap heap. And individual electric drive on lathes and other shop tools reduces the time required to perform the work.

A Few Westinghouse Specialties for the Shop are:

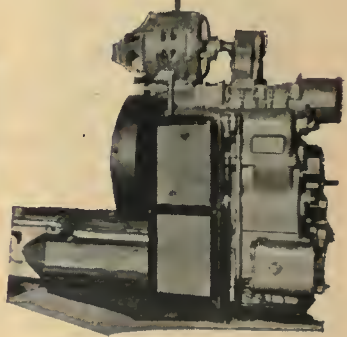
- Motors and Controllers
- Arc Welders (Electric)
- Babbitt Pots (Electric)
- Bake Ovens (Electric)
- Furnaces (Electric)
- Glue Pots (Electric)
- Industrial Lighting
- Insulating Materials
- Micarta Gears
- Panel Boards
- Safety Switches
- Switch Boards
- Heating Units (Electric)

Specify Westinghouse Equipment when purchasing motor driven tools and equipment

Westinghouse Portable Arc Welder

Westinghouse Type K-W Baking Oven

Westinghouse Industrial Motor Application



Westinghouse

Service to the Industry

Westinghouse Central Station Equipment

- Turbines
- Condensers
- Stokers
- Generators
- Switchboards
- Switchboard Apparatus
- Electrical Instruments
- Meters
- Voltage Regulators
- Lightning Arresters

In Power Generation

When generating units of a few hundred kilowatts capacity were considered large, Westinghouse machines were noted for their performance. Today the remarkable efficiency and wonderful operating results of Westinghouse generating equipment of the astounding capacities demanded by modern central station practice commands the attention of the engineering world. The demands of industry and civilization for more and more power, as well as cheaper and cheaper power, have been anticipated and met by Westinghouse equipment.

Whether large or small the Westinghouse equipped station is an efficient station.

Westinghouse

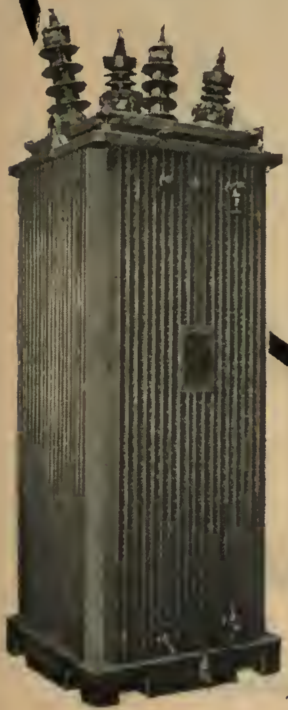
Service to the Industry

In Power Transmission and Distribution

THE AUTOMATIC SUBSTATION

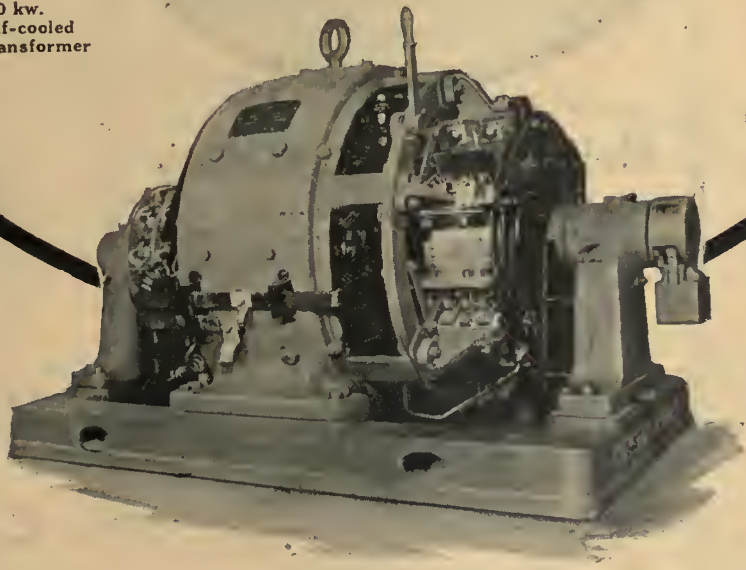
To the layman there is something almost uncanny about the operation of the automatic substation. How it functions so accurately and reliably without human attendants is almost too much for any but the trained engineer to understand. But the practical railway operator, whether engineer or not, thoroughly appreciates today the service and economy of this marvelous development.

Westinghouse engineers have now reached another milestone in the development of the automatic substation. An electro pneumatic switch control system has been developed to successfully serve heavier apparatus. A substation of this type will be seen for the first time in the Westinghouse exhibit at the Atlantic City Convention.



**300 kw.
Self-cooled
Transformer**

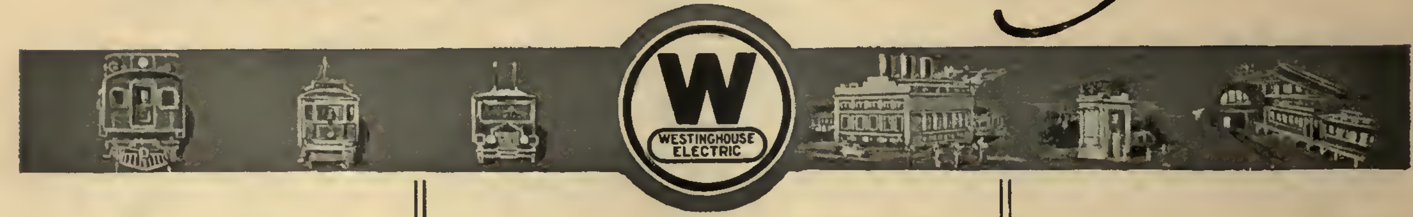
**300 kw.
Rotary
Converter**



**Latest
Electro-pneumatic Control**

Westinghouse

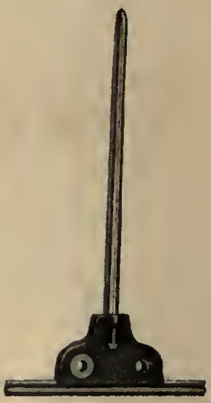
Service to the Industry



On the Line

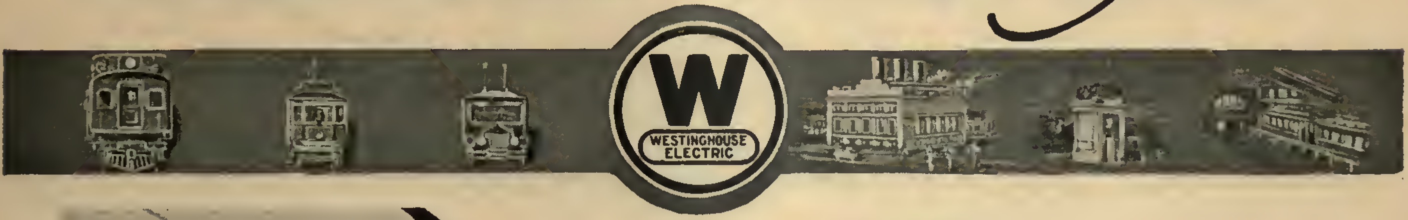
Reliability—Durability

On the trolley line, as nowhere else, the equipment must be absolutely reliable. Inspection is difficult and infrequent and a break means not only the tieing up of one car alone but of the entire system. The Westinghouse Company early recognized the importance of eliminating line trouble as a vital factor in furnishing uninterrupted transportation to the public. Westinghouse line materials now include everything but the wire. They afford an opportunity for standardizing on one high quality stock of parts which will stand the strain of the heaviest service and the most severe weather conditions.



Westinghouse

Service to the Industry



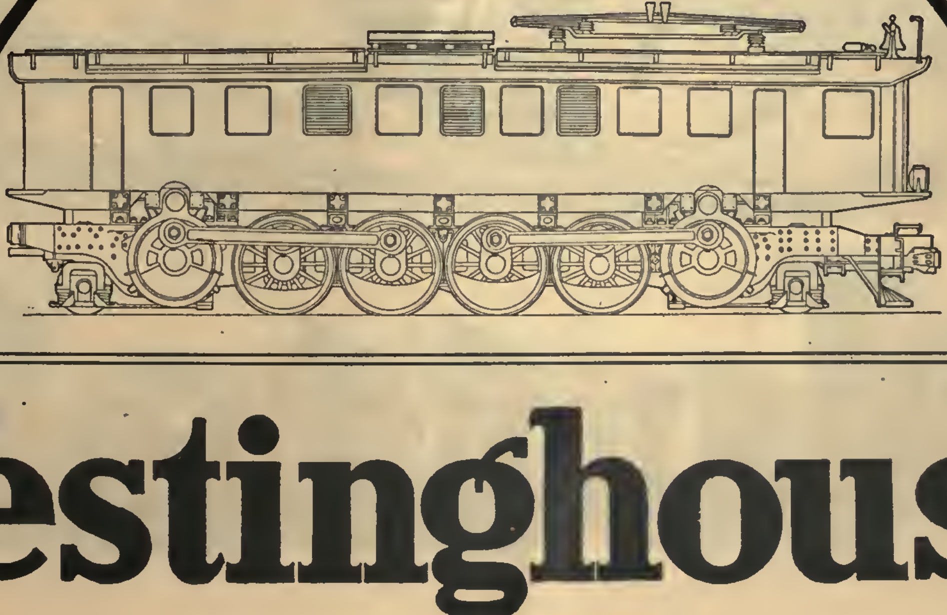
In the Field of Railroad Electrification

The service of electricity is available to the railroads in improving operation; expanding capacity; and removing the obstacles to progressive development which exist with present steam operation.

The most recent achievements of the application of electrification are:

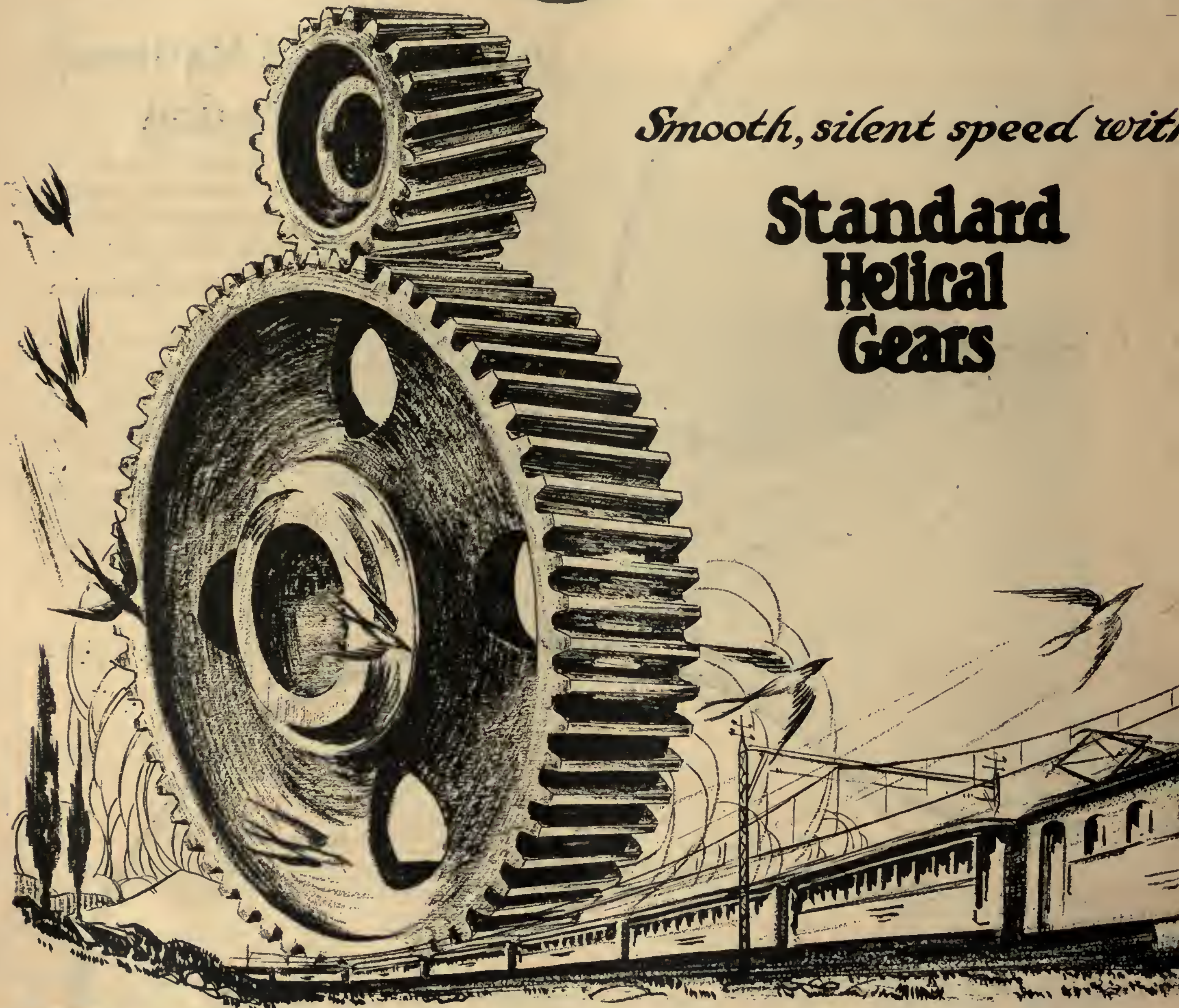
The completion and shipment of all materials for the electrification of the Chilean State Railways and the inauguration of service on those lines.

And crowning all achievement in this field is the recent award to the Westinghouse Company of a $15,000,000 contract to electrify 213 miles of the Virginian Railway with the highly successful 11,000 volt single phase alternating-current system.



Westinghouse

Service to the Industry



Smooth, silent speed wit

Standard Helical Gears

Nuttall

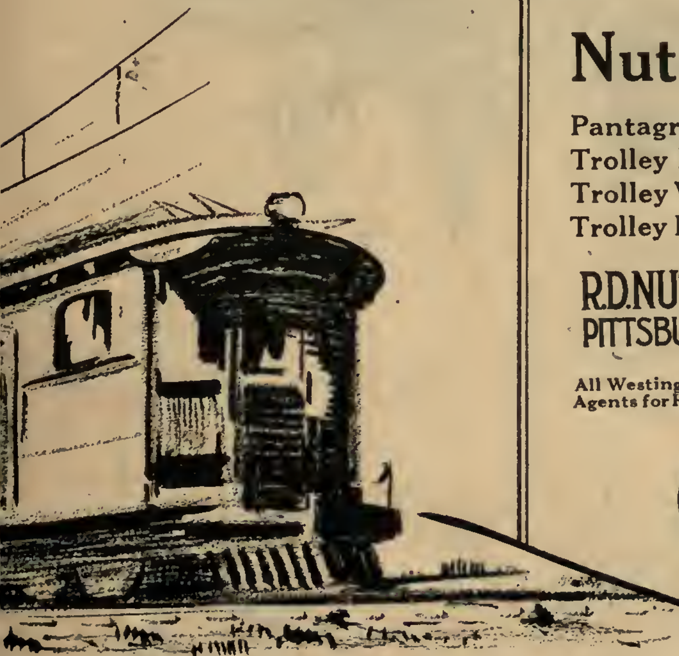
Service to the Industry

Cut maintenance costs through longer gear life

How does a 500,000 mile record for one set of gears strike you? This is what the original installation of Nuttall Standard B.P. Helicals has done for the West Penn Railways Company. In service since 1915, the maximum wear shown today is only 1/32 of an inch. Apart from this evident economy in operation, the Company reports that they have at the same time greatly reduced trouble from motor "buck-overs" and open circuits, resulting in lower motor maintenance.

Quite naturally, the West Penn Railways Company has standardized on Nuttall Helicals. And they are not alone; practically every traction property in the country is using more or less helical gears.

The secret of Nuttall Helical Gears lies in the 7½° Helix Angle; the long and short addendum tooth design, and the Nuttall B.P. Heat Treating Process. The meshing of the teeth is like the turning of a screw—smooth, vibrationless, noiseless, shockless. There is no grinding, and no chattering.



Nuttall

Pantagraphs
Trolley Bases
Trolley Wheels
Trolley Harps

Like Nuttall Gears, these products are the result of an intimate practical knowledge of electric railway requirements. In design, material and workmanship they will meet with your most exacting requirements.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse District Offices are Sales Agents for R. D. Nuttall Company products.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Nuttall

SAFETY CARS

Indorsed by all who know them

58
SAFETY
SERVICE
ECONOMY
5507
The Men who Run Them
The Men who Manage Them
The People who Ride in Them

SAFETY CARS bring UNIVERSAL SATISFACTION.

To the Public they mean quicker and more frequent service. To the Owner, a source of increased net revenue. To the Operator, a more interesting, less monotonous job; fast pick-up; short, smooth stops; labor-saving devices which automatically guard against mistakes.

Everybody finds some advantage in the Safety Car—all indorse it.

SAFETY CAR DEVICES CO.

Where the Safety Car Stands Today

A National Institution

THE Safety Car today is a national institution in the street railway field. It is found in ever-increasing numbers in cities of all sizes in every part of the United States, and in Canada, Mexico, Cuba, South America and the Orient as well.

In principle it offers definite and obvious advantages which are shown by experience to fit perfectly into modern operating conditions. It is an economic factor of the greatest importance to the public, and is so recognized by the closest students of transportation methods.

The many instances of its use today to the almost utter exclusion of all other types of cars is striking evidence of the pre-eminent success it has attained.

Some Recent Orders for Safety Car Control Equipment

Below are listed some of the latest orders for Safety Car Control Equipment:

Aurora, Elgin & Chicago R.R.	40 sets *
Brooklyn City Railroad Co.	200 sets
Connecticut Co.	50 sets *
Dallas Railway Co.	30 sets
Kansas City Railways Co.	101 sets *
Louisville Railway Co.	53 sets *
Milwaukee Elec. Ry. & Lt. Co.	35 sets *
Northern Texas Trac. Co.	32 sets *
Peoples Railway Co.	40 sets
Philadelphia Rapid Transit Co.	520 sets *
San Francisco-Oakland Terminal Rys.	55 sets *

*Repeat Order

OUR EXHIBIT—*Space 19*
A. E. R. A. Convention

We cordially invite all members of the industry to visit our special exhibit of Safety Car Control Equipment in Space No. 19 at the A.E.R.A. Convention. A fully-equipped Safety Car will be on display.

Over 9000 Now in Service on More Than 400 Properties

The number of Safety Cars now in service may be determined with fair accuracy by referring to our records of orders for Safety Car Control Equipment.

To date we have furnished over 9,000 sets of equipment for application to that number of cars, both new and old, on more than 400 properties.

2,388 of these cars were equipped in 1922, and equipment ordered during the first seven months of 1923 totalled 1,575 sets.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

A Remarkable New Braking Principle ~

The "VARIABLE LOAD" BRAKE
as applied to light-weight surface cars

PROVIDES a braking force varying automatically with the weight of the load; insures short, *uniform* stopping distance regardless of whether car is empty, partially loaded, or loaded to full capacity.

EASTERN MASSACHUSETTS ST. RY. CO.

BOSTON ELEVATED RAILWAY CO.

NEW YORK MUNICIPAL RY. CORP.
Works Like a Scale

FIRST USED IN THE SUBWAYS

The Westinghouse Variable Load Brake was originally conceived in connection with the traffic problems of the New York Subways. It was applied to the operations of the New York Municipal Railway Corporation in 1915 and immediately resulted in reducing headway to such an extent as to permit the use of many additional train units, thereby increasing the passenger carrying capacity of the road.

Faster Schedules

THE Variable Load Brake has been adapted to the light-weight surface car primarily as a means of speeding up schedules and increasing car mileage, especially in congested traffic centers.

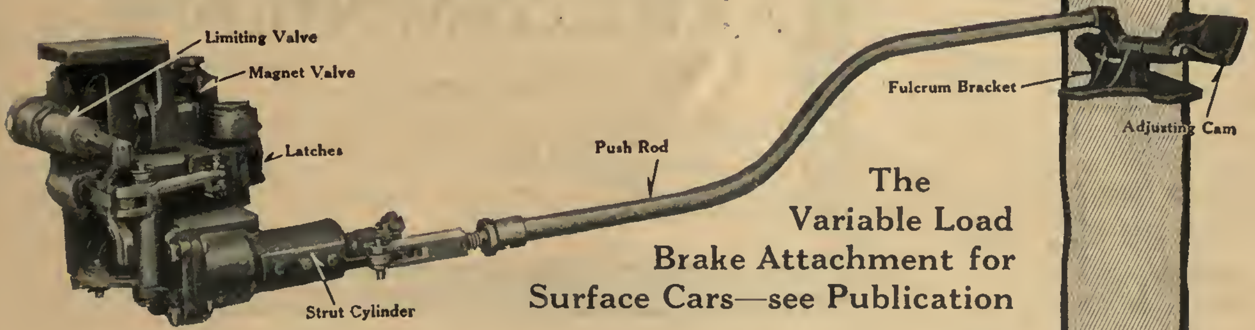
It accomplishes this by insuring stops of a uniform distance irrespective of the load that is carried—stops as short under all conditions as would normally be possible only with an empty car. The motorman can, therefore, cut down his running time between stops by operating at peak speed for longer periods before decelerating.

Increased Earnings

In this way the Variable Load Brake has demonstrated that it will increase the earning ability of car units by increasing daily car mileage, in addition to offering the public a faster, safer and more satisfactory type of service.

Over 1,500 sets of "Variable Load" equipment are now in service or on order as a result of satisfactory performance records, the following companies having specified it for cars now in use or being built: Eastern Massachusetts St. Ry. Co.; Boston Elevated Ry. Co.; Brooklyn City Railroad Co.; the Connecticut Co.; Union St. Ry. Co.; New York Municipal Ry. Corp.

Westinghouse Apparatus includes Westinghouse Service



The Variable Load Brake Attachment for Surface Cars—see Publication T-2045

AT THE CONVENTION

The Variable Load Brake will occupy a prominent place in the Westinghouse exhibit at the A. E. R. A. Convention. You are cordially invited to inspect it and have our representative explain more fully its advantages.

Westinghouse Traction Brake Company
Wilmerding, Pa.

An Easy Investment to "Carry"

WESTINGHOUSE
NATIONAL
3VS
COMPRESSOR

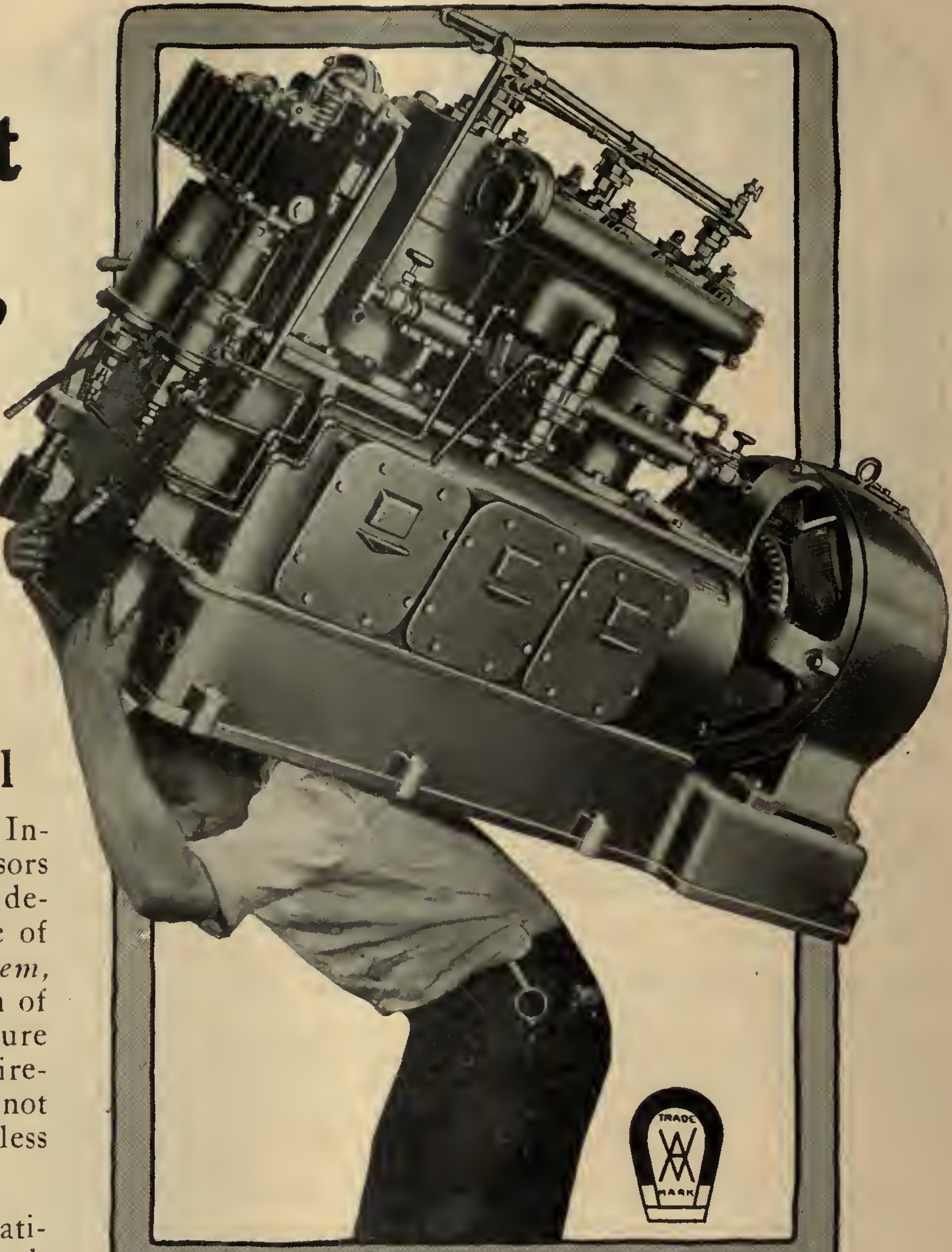
with Automatic Control

WESTINGHOUSE-NATIONAL Industrial Air Compressors carry an extremely low rate of depreciation and upkeep because of the *Automatic Control System,* which causes a total suspension of operation when sufficient pressure has been built up to meet requirements. The machine does not operate continuously, hence less wear on the moving parts.

And because it operates automatically only as requirements demand, there is a corresponding saving in power consumption.

Used extensively for power plant, car barn, shop and track construction service. Stationary and portable types.

WESTINGHOUSE
TRACTION BRAKE CO.
General Office and Works:
WILMERDING, PA.



Space 144 at the A.E.R.A. CONVENTION

See it in Operation

A machine of the type illustrated above, with special glass-enclosed crank case, may be seen in full operation at Space No. 144 during the A. E. R. A. Convention. If unable to attend the convention write for Descriptive Catalog T-2032.

WESTINGHOUSE—NATIONAL *Air Compressors*

"QUALITY MACHINES FOR QUALITY SERVICE"

Vol. 62, No. 13

New York, September 29, 1923

Pages 473-544

HENRY H. NORRIS
Engineering Editor
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A 75,000-Word Editorial on Cars

IN NO branch of electric railway work has there been so much development in the last two years as in the car itself. During the last year, particularly, it has been difficult from the standpoint of balance of editorial contents to keep the paper from dealing preponderantly with this phase of the industry.

Hence, it was plainly evident, when it came to selecting the most appropriate theme for this year's Annual Convention Number, in honor of the American Electric Railway Association Convention at Atlantic City, Oct. 8 to 12, that car development was the subject in which there would be greatest interest.

This issue is therefore devoted to the task of bringing to the industry a broad perspective of the direction and nature of recent development in electric railway car design.

As the result of very painstaking study that has occupied a good part of the editorial staff over a period of more than three months, the subject matter of this issue gives the reader a concrete conception of the recent advancement of the art with respect to almost every detail of the car.

In reality, this Convention Number is more than just a perspective of what has recently been done. It is a 75,000-word editorial on cars. It points out the trend of developments, the good and the fallacious, and indicates what seem likely to be, or what may well be, the future lines of development. It is believed that the executives, transportation men, engineers and equipment maintenance men will find much of practical interest and helpfulness to them in this treatise.

On the whole, this number is designed to place before the industry as complete a "book" on all the newer developments as anyone will need to read to be fairly abreast of the times on the subject of cars and car equipment. It should be of use in the common endeavor to build cars that will be cheaper to operate and maintain, better to look at, more pleasant to ride in, more efficient all around, and more surely competent to meet bus and private automobile competition.

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American Machinist—European Edition
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Number of copies printed 7,700

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

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Published weekly
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
Printed in U. S. A.

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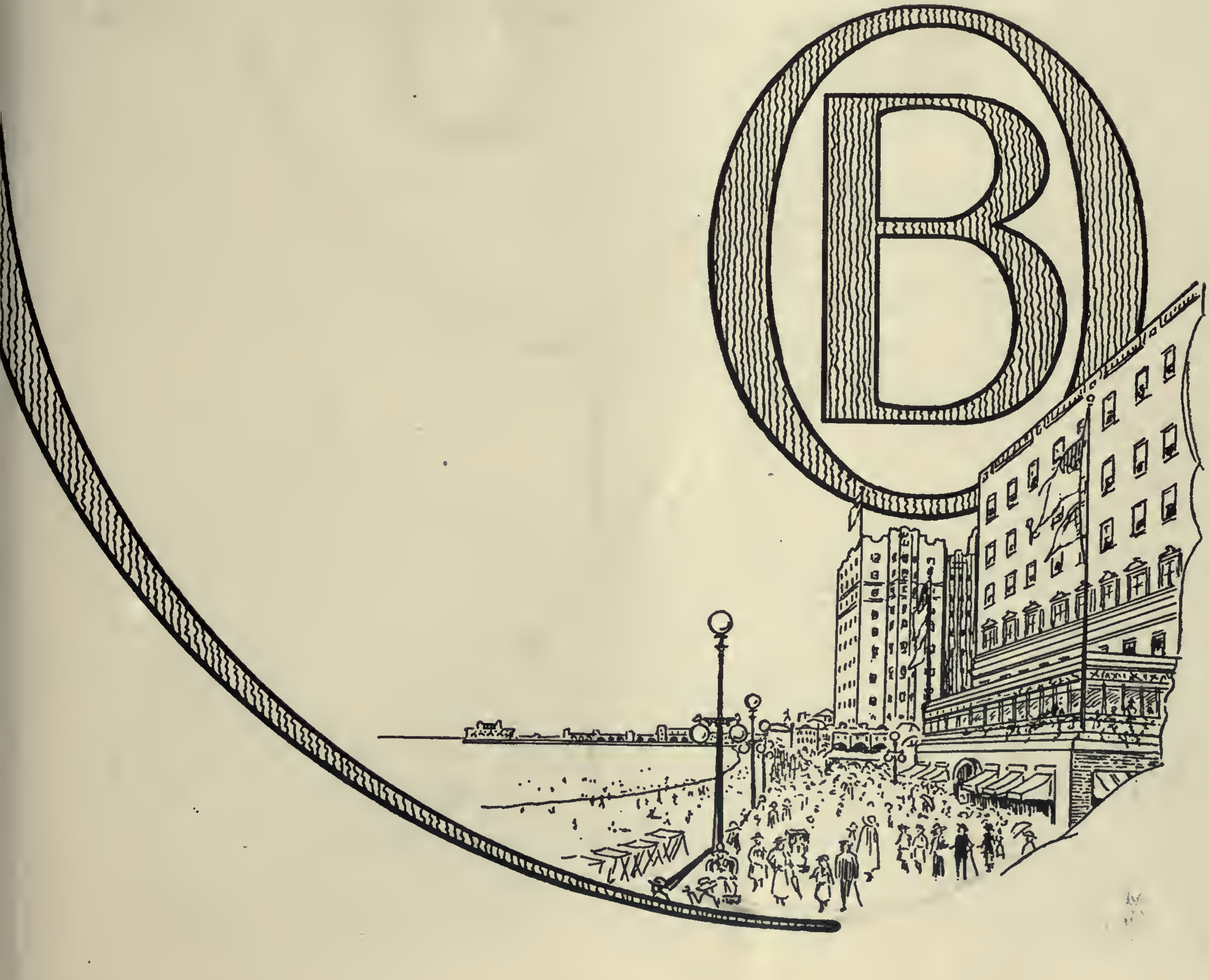

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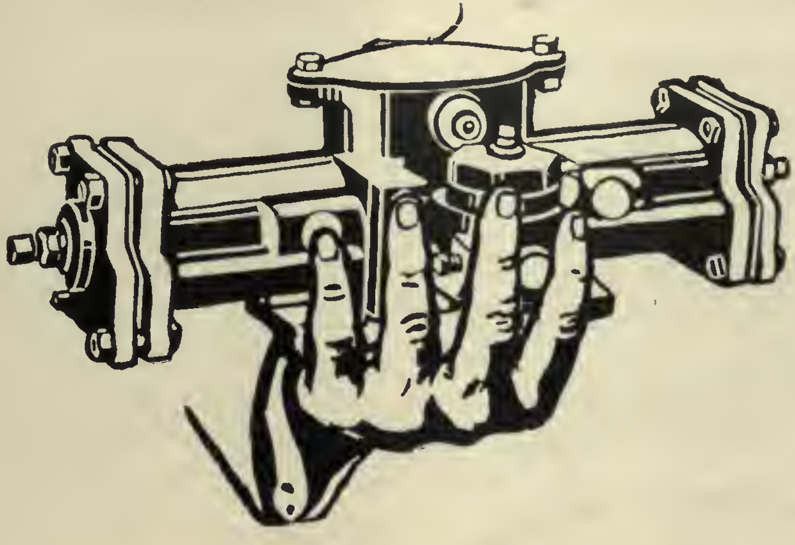

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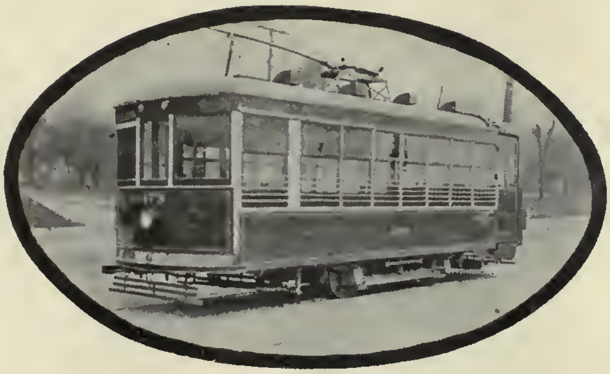

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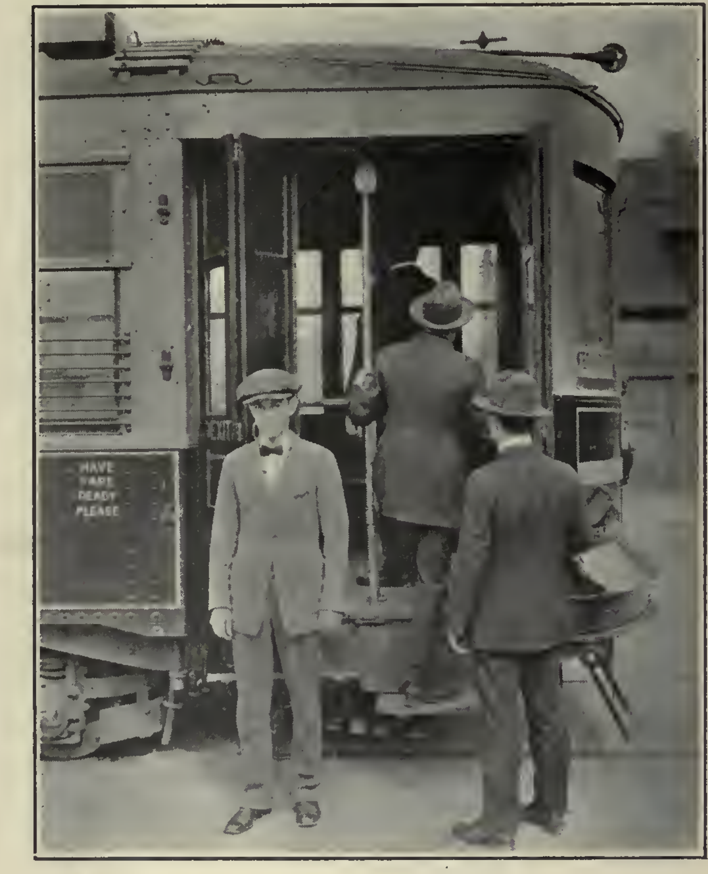

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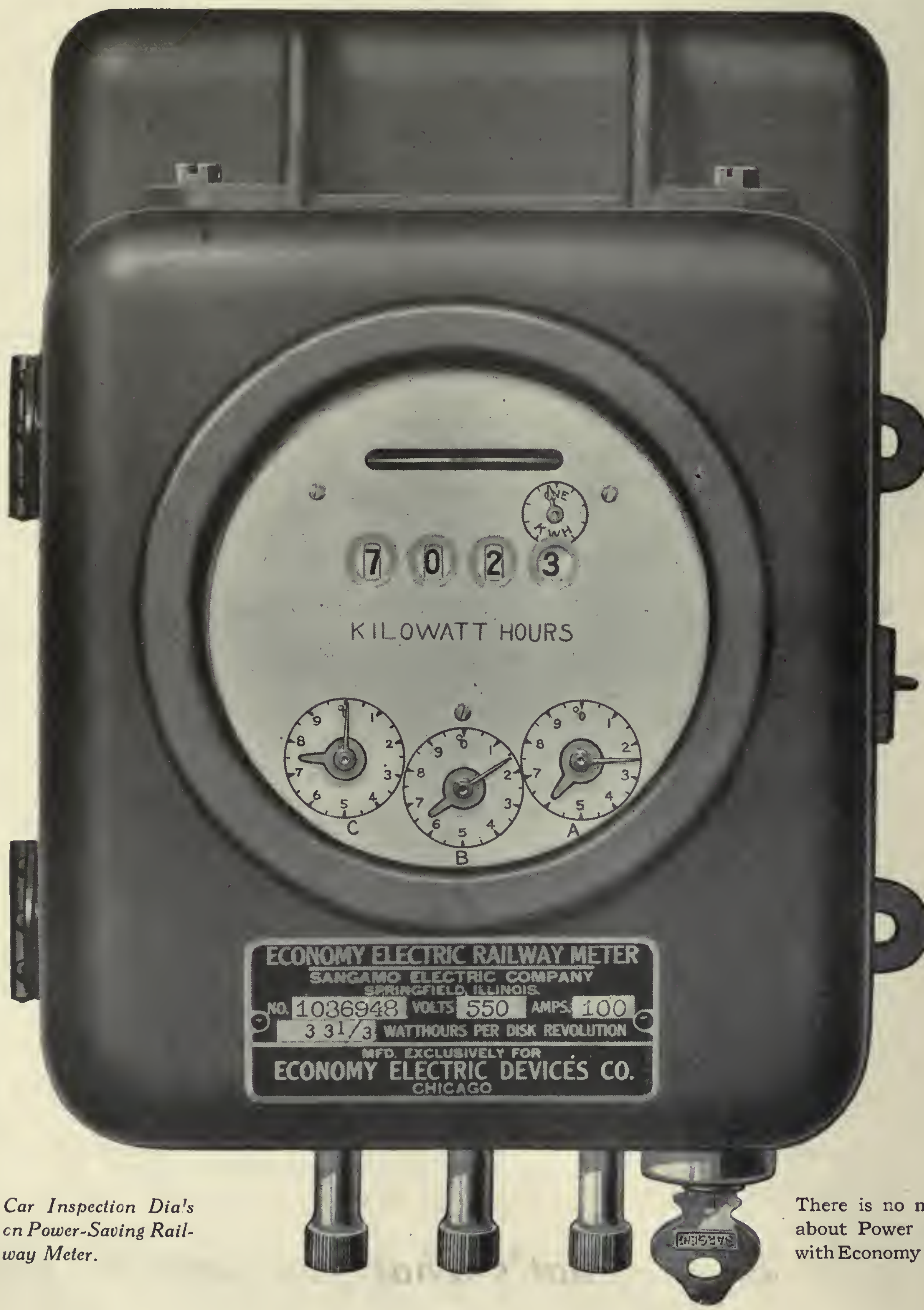
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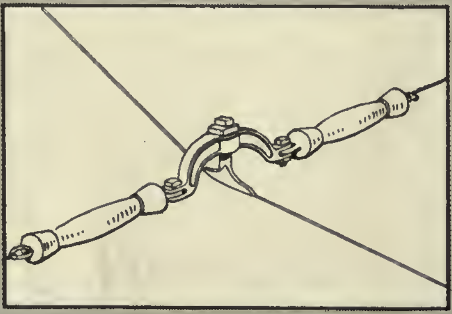

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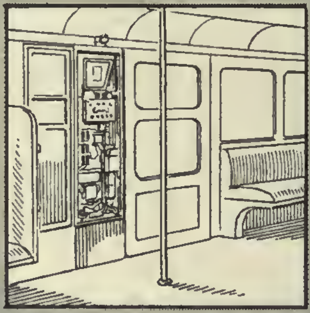

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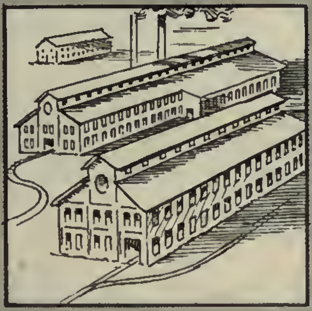

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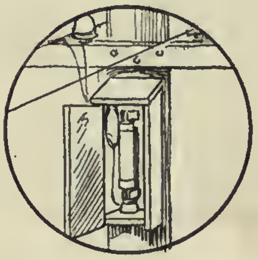

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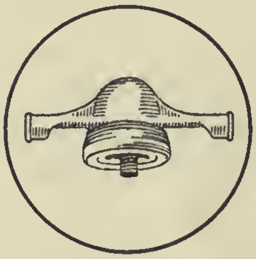

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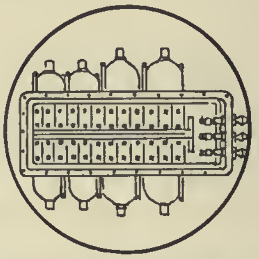

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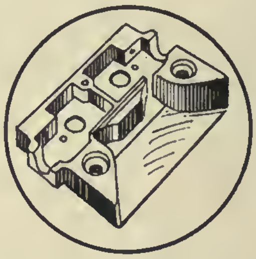

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12. If gas or oil engines are used, horsepower and make.
13. Transmission voltage.
14. Trolley voltage.
15. If energy is purchased, from whom.
16. Number and capacity of sub-stations, number of rotary converters and motor generator sets used.
17. Amusement parks reached, whether owned or controlled by company.
18. Mileage of the road, owned, leased and trackage rights.
19. Miles in paved streets.
20. Gage of track.
21. Number and kind of rolling stock used.

*22. Number of one-man cars.

*23. Rate of fares.

24. Doing a lighting business.
25. Date of latest information.
26. Names, officers and executive committees of Electrical Railway Associations, arranged alphabetically by name.
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Lorain Steel Co.

Metal Railway Safety Tie Co.
Metal & Thermit Corp.

Nachod Signal Co., Inc.
National Paving Brick Mfrs. Assn.
National Tube Co.
New York Switch & Crossing Co.

Okonite Co.

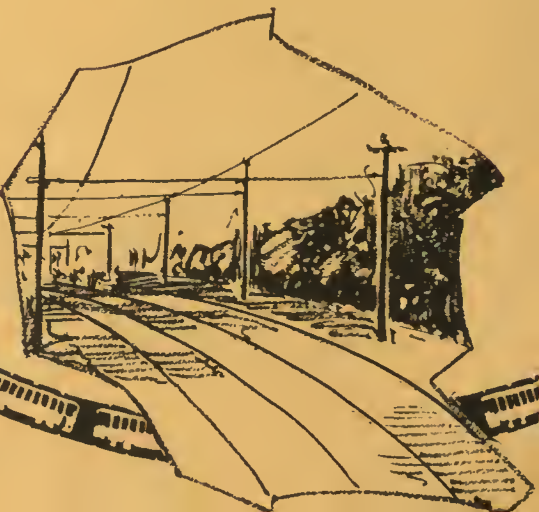
Paxson Co., J. W.

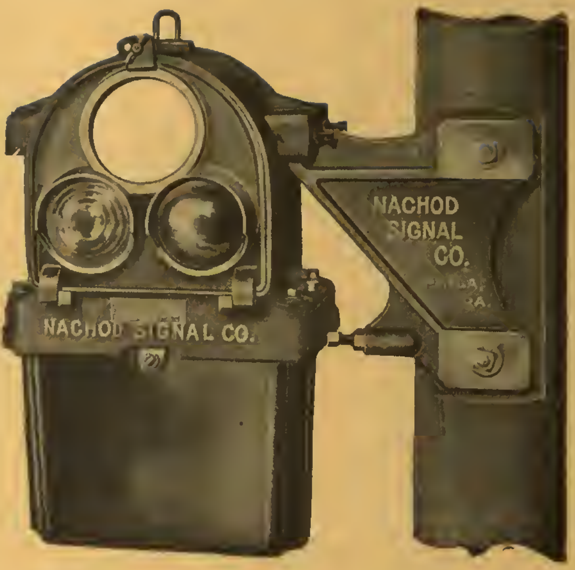
Rail Joint Co.
Rail Welding & Bonding Co.
Railway Track-work Co.
Ramapo-Ajax Corp.
Roebling Sons Co., John A.
Roller-Smith Co.

Seymour Rail Grinder Co., E. P.
Shaw, Henry M.
Standard Underground Cable Co.

U. S. Electric Signal Co.

Western Electric Co.
Wharton Jr. & Sons Co., W. M.
Wood Co., Chas. N.





Nachod Says:
"Wait at this Siding"

No danger of a car running past a siding and meeting another when your line is equipped with NACHOD Automatic Signals. The "long arm of warning" reaches out and holds one at the siding while the other runs the single track.

The Nachod Signal never forgets, never sleeps, never relaxes its vigilance. N-A-C-H-O-D "spells safety" to the entire system.

No other current is needed except that already in your trolley system. There is nothing about Nachod Signals to get out of order to interfere with the reliability of their service. They are easy to install and maintain. No tearing up of track or rebonding—no insulated joints. Brilliant day and night signals—separate and independent.

Over 125 electric railways in America and foreign countries use Nachod Signals. Our Catalog No. 719 gives complete information on block signals. *Write for it.*

Nachod Signal Co., Inc.
Louisville, Kentucky

NACHOD

The Storm-test of Service

Five years of dependable service through varying temperatures, high winds, heavy snows, rain and thaws—such is the performance of 6,000,000 pounds of Anaconda Copper Trolley Wire, Feeder Cable and Signal Line Wire now in use on the Chicago, Milwaukee & St. Paul Rocky Mountain electrification.

For uninterrupted service specify Anaconda Copper Wire.

Anaconda
Copper Mining
Company
Rolling Mills Dept.
Chicago, Ill.

A comprehensive exhibit of Anaconda Copper and Brass Products will be on display in booth 525 during the Atlantic City Convention of the American Electric Railway Association.

The
American Brass
Company
25 Broadway
New York

ANACONDA
TROLLEY WIRE

Every International Tie Is Inspected Singly

The I. C. C. Co. Dating Nail permanently identifies International Ties.

THE International Organization maintains a corps of able men, competently trained, and impressed with the necessity for a consistent and fair enforcement of the provisions of the A. R. E. A. Tie Specifications.

It is also their duty to instruct all International Tie Producers so that they are thoroughly familiar with the grades and their respective arithmetical dimensions which later form a basis for all inspection.

International representatives inspect each tie singly for signs of fungi attack and other strength impairing defects. They request that all ties subject to their inspection be piled openly so that each tie can be inspected for its entire length from both ends. The grade of the tie is then determined accurately with the aid of a rule and the grade is marked on both ends of each tie with paint.

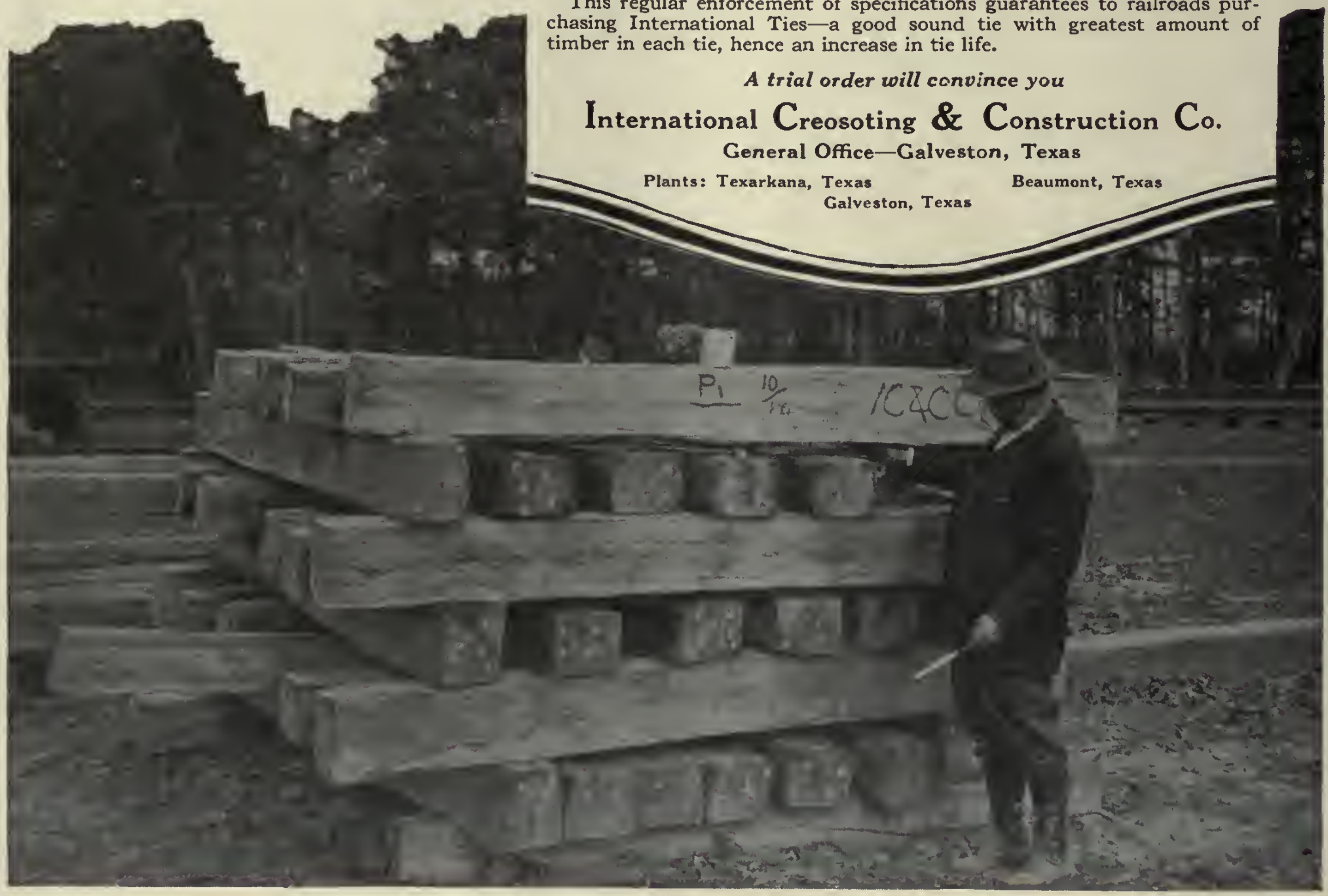
This regular enforcement of specifications guarantees to railroads purchasing International Ties—a good sound tie with greatest amount of timber in each tie, hence an increase in tie life.

A trial order will convince you

International Creosoting & Construction Co.

General Office—Galveston, Texas

Plants: Texarkana, Texas — Beaumont, Texas
Galveston, Texas



OKONITE

The Standard for Rubber Insulation

Okonite and Varnished Cambric Wires and Cables.
Okonite Railroad Wires—Signal Wires, Car Wires,
Plough Leads; Okonite Splicing Materials—
"Okonite" Splicing Tape, "Manson" Friction Tape, "Dundee A & B" Friction
Tapes; "Okonite" Cement,
Okokord, Okoloom

Booth 540

THE OKONITE CO., PASSAIC., N. J.
Incorporated 1884
Sales Offices: New York — Atlanta — San Francisco
Agents: Central Electric Co., Chicago, Ill.; Pettingell-Andrews Co., Boston, Mass.; The F. D. Lawrence Electric Co., Cincinnati, Ohio; Novelty Electric Co., Philadelphia, Pa.

During the Convention our Representatives will be located at the Traymore and Ambassador

Locke Insulators

TWENTY-TWO years of continuous and satisfactory service is the record of the Locke Insulators now installed on the Martinez Line of the Pacific Gas & Electric Company shown in the insert above. These insulators were sold in 1899, and after seven years on other lines they were transferred to the Martinez-Richmond Line.

They are still on the line and still in excellent condition.

Locke Insulator Corporation

VICTOR, N. Y.

Factories: Victor, N. Y., and Baltimore, Md.

ELRECO POLES

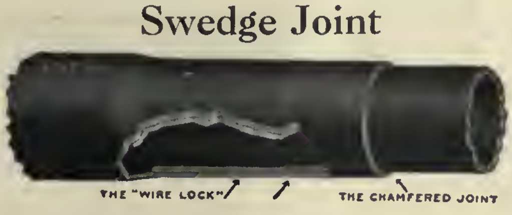
Plain Tubular Steel

Extra strong, and capable of sustaining heavy strains in any direction—especially valuable at corners. No angles or pockets to retain moisture—no corners accessible to corrosion—most accessible to painting.

Combination Railway and Lighting

Elreco Poles in combination with highly ornamented G. E. Novalux Lighting Units, are being widely used to replace unsightly wooden poles, to eliminate duplication of facilities and to reduce costs.

Patented Wire Lock Swedge Joint



The edge of the outer tube is chamfered, so that water can not rust the pole at this joint. It is impossible for poles made up in this manner to telescope at the joints, either by overloading or by the drop test.

The Electric Railway Equipment Co.
Cincinnati, Ohio
New York Office: 30 Church Street

ANDERSON

equipment helps to sell transportation by *preventing delays* that annoy the public

Anderson Crossovers prevent delays by eliminating the breaking of the trolley wire at crossover points

They insure long wear of both crossing and wires. The approach ears of bronze are pivoted to the main casting. This permits them to rise slightly with the approach of the trolley wheel, thus taking the wear off the wires at the point subject to greatest injury. This prevents crystallization and the subsequent breakage at those points.

Lindall Brush Holders prevent many delays due to motor trouble

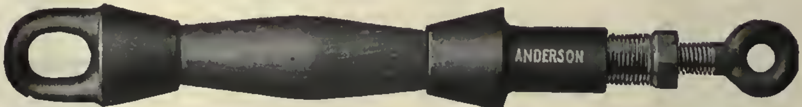
They guarantee constant brush pressure and this assures sparkless commutation.

Anderson Round Top Straight Line Suspensions prevent delays due to breakage from line contractions

Their great mechanical strength prevents the annoyance due to breakage which often comes with the inevitable wire contraction in winter. Also line foremen prefer them because they prevent creepage troubles.

Anderson Canopy Switch prevents delays by quick action

And because they never stick they have replaced ordinary circuit breakers on thousands of cars.



Anderson Double Takeup Wood Strain Insulators help to prevent delays due to guy wire evils

They take up the slack in guy wires without any twisting effect. The double take-up feature cuts the adjustment time in half. And good insulation, high tensile strength and perfect adjustment assure the right operation of the guy wire which prevents delays from mal-alignment of the trolley wire.

Please call at space 47, Section F

TRADE MARK

Reg. U. S. Pat. Off.

Albert & J. M. Anderson Mfg. Co.

Established 1877

289-293 A St., Boston, Mass.

Branches—New York, 135 Broadway. Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 12 Moor Lane E. C. 2.

TRADE MARK AETNA REGISTERED

NO ORDER SO LARGE
AS TO OVERTAX
OUR FACILITIES

MONEY SAVED
BY ADVANTAGEOUS
FACTORY LOCATIONS

NEW ST. LOUIS FACTORY—MAIN BUILDING 560 BY 320 FEET

A Complete Service

to All Users of Electric Wires and Cables

is afforded by the extensive and complete line of STANDARD Products, the new or enlarged STANDARD Factories centrally located at advantageous shipping points, and STANDARD Sales Offices in the principal cities of the United States and Canada.

STANDARD Products

(Outline List)

Copper, Brass, Bronze Wire
Copper Clad Steel Wire
Magnet and Weatherproof Wire
Rubber Insulated Wire
Varnished Cambric Insulated Cable
  Braided and Lead Covered
Paper Insulated, Leaded Cable
Rubber Insulated, Leaded Cable
Steel-Wire-Armored Cable
Steel-Tape-Armored Cable
Outdoor Cable Terminals
Indoor Cable Terminals
Cable Junction Boxes
Insulating Compounds, Etc.

STANDARD Factories

Perth Amboy, N. J. Pittsburgh, Pa. St. Louis, Mo. Oakland, Calif.
For Canada: Hamilton, Ont.

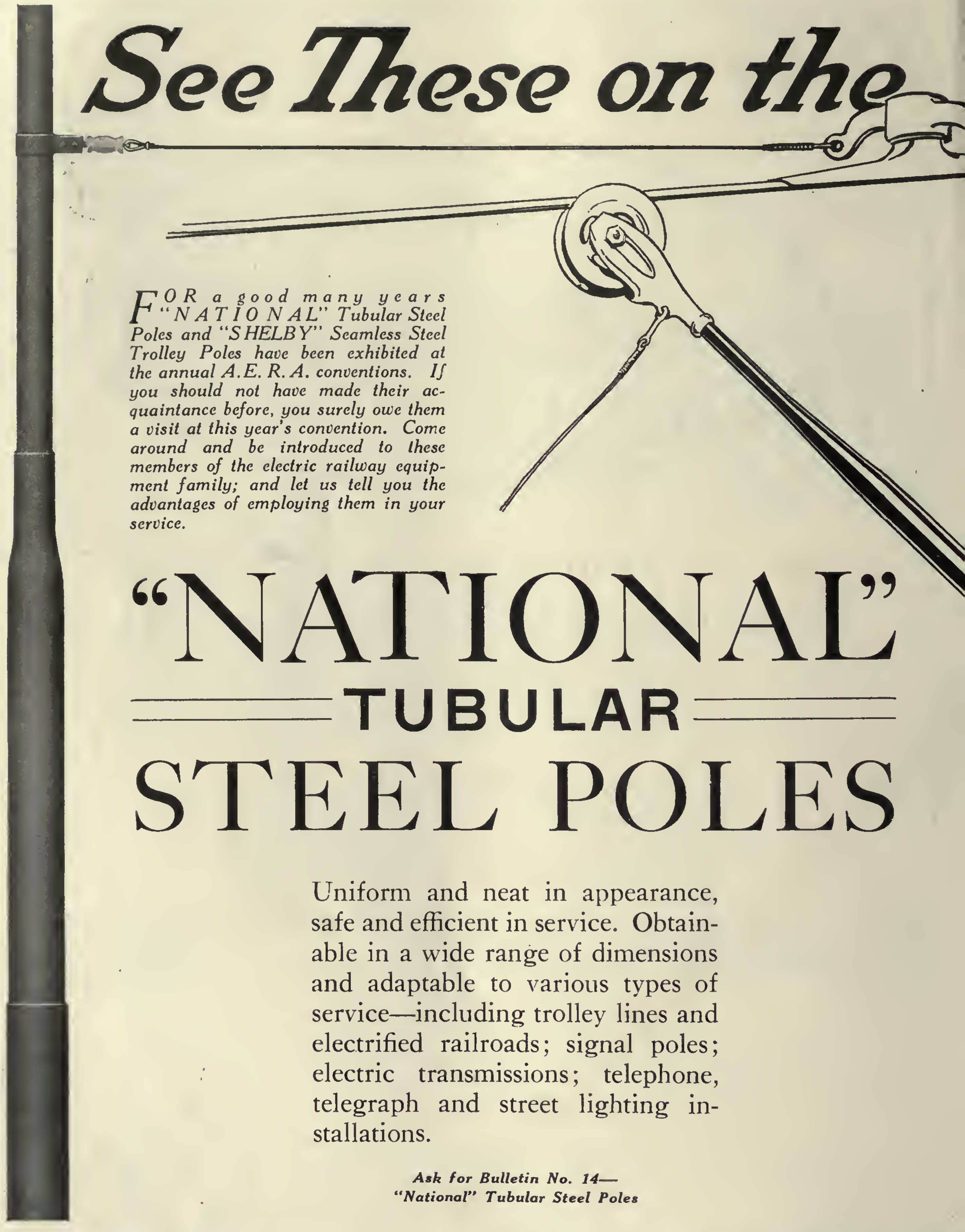
STANDARD Sales Offices

Boston Philadelphia Atlanta Chicago Kansas City
New York Washington Pittsburgh Detroit St. Louis
Los Angeles Seattle San Francisco
For Canada: Montreal, Toronto, Hamilton, Winnipeg

This exceptional service means economy in time and money to our customers. It will be mutually advantageous, therefore, for you to confer with us in regard to your wire and cable requirements.

Our representatives may be found at Booth 405, A.E.R.A. Convention, or write our nearest sales office.

Standard Underground Cable Co.
General Offices: Pittsburgh, Pa.
For Canada: Standard Underground Cable Co. of Canada, Limited, General Offices: Hamilton, Ont.



See These on the

FOR a good many years “NATIONAL” Tubular Steel Poles and “SHELBY” Seamless Steel Trolley Poles have been exhibited at the annual A.E.R.A. conventions. If you should not have made their acquaintance before, you surely owe them a visit at this year's convention. Come around and be introduced to these members of the electric railway equipment family; and let us tell you the advantages of employing them in your service.

“NATIONAL” TUBULAR STEEL POLES

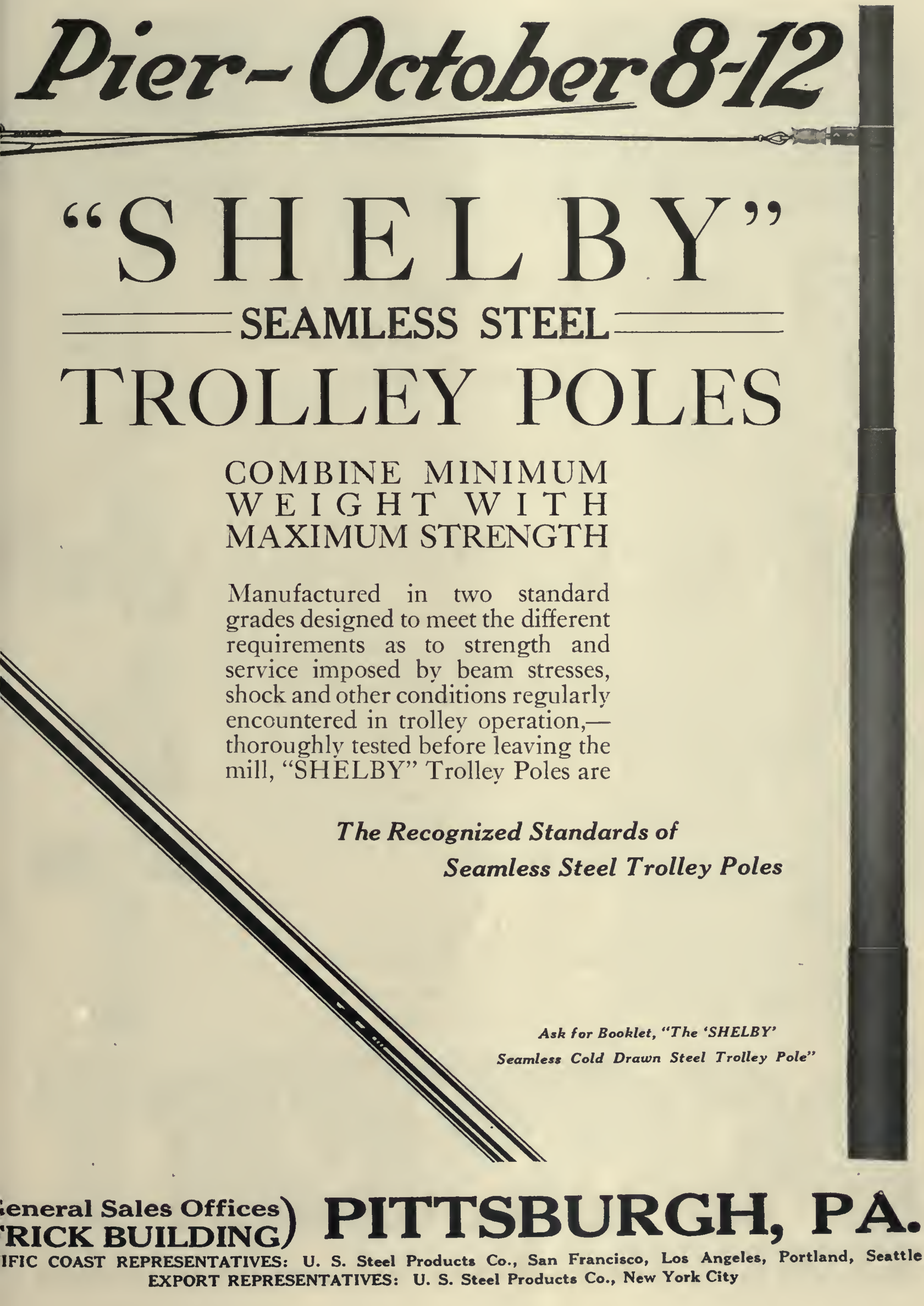
Uniform and neat in appearance, safe and efficient in service. Obtainable in a wide range of dimensions and adaptable to various types of service—including trolley lines and electrified railroads; signal poles; electric transmissions; telephone, telegraph and street lighting installations.

Ask for Bulletin No. 14—
“National” Tubular Steel Poles

NATIONAL TUBE COMPAN

DISTRICT SALES OFFICES

Atlanta
Boston
Chicago
Denver
Detroit
New Orleans
New York
Salt Lake City
Pittsburgh
Philadelphia
St.
St.



Pier—October 8-12

"SHELBY"

SEAMLESS STEEL

TROLLEY POLES

COMBINE MINIMUM WEIGHT WITH MAXIMUM STRENGTH

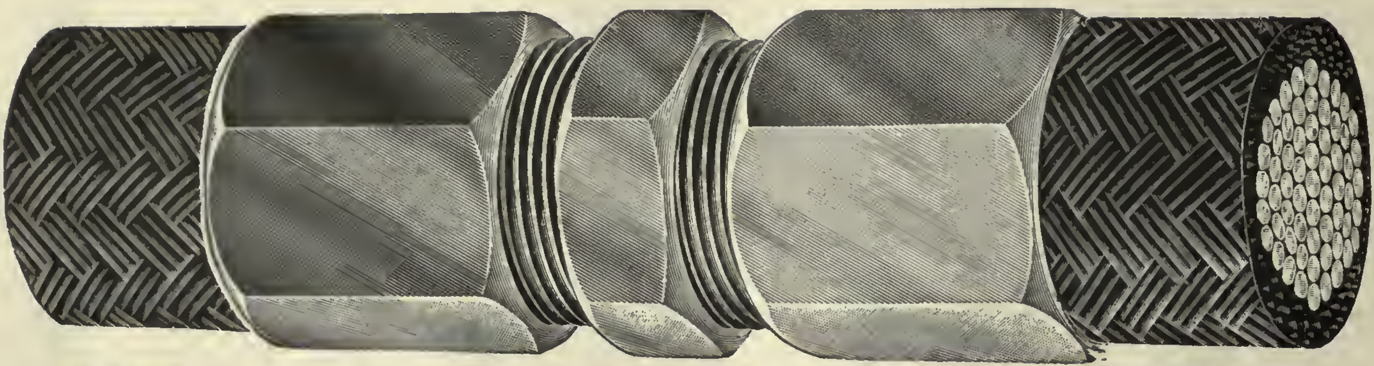
Manufactured in two standard grades designed to meet the different requirements as to strength and service imposed by beam stresses, shock and other conditions regularly encountered in trolley operation,—thoroughly tested before leaving the mill, "SHELBY" Trolley Poles are

The Recognized Standards of Seamless Steel Trolley Poles

Ask for Booklet, "The 'SHELBY' Seamless Cold Drawn Steel Trolley Pole"

eneral Sales Offices)
RICK BUILDING) **PITTSBURGH, PA.**

IFIC COAST REPRESENTATIVES: U. S. Steel Products Co., San Francisco, Los Angeles, Portland, Seattle
EXPORT REPRESENTATIVES: U. S. Steel Products Co., New York City



How to Solve Your Difficult Problems in Wiring and Cable Work

WIRING and cable problems are all in the day's work, but just so surely as they crop up just so surely can they be solved at a saving in time, labor and materials of installation.

No matter what service, great or small, there is a Dossert Connector that will do the work more easily, more quickly and for less money — and will give a better connection.

Dossert Connectors assure that the connections and terminals are doing their part to maintain an unimpeded flow of current with minimum heat losses. Tests which have been made from time to time by users of Dossert Connectors show that the connectors run at as low temperature as enabled by the wires connected to them.

Labor is time and time is money. Dossert Connectors save time and hence save labor. This item alone justifies their selection over any other type of connection.

Don't let this wiring question puzzle you. The answer to it is clear.

Write for Catalog No. 15

DOSSERT & COMPANY

H. B. LOGAN, President

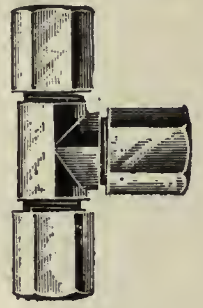
242 West 41st Street, New York

Elbow

Y-Joint

Swivel Lug

Back Lug



3-Way Joint

Cable Anchors

Cable Tap

DOSSERT

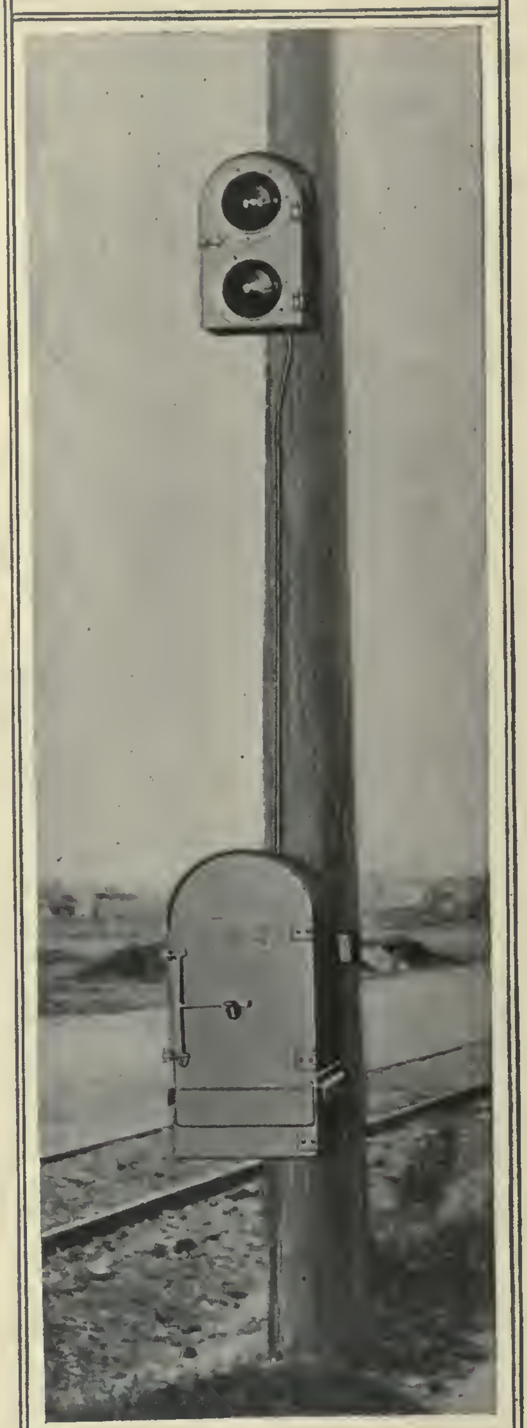
SOLDERLESS-Connectors and Terminals

The Light

where the motorman
can see it best

The Mechanism

where it can be
most easily
inspected



Many advantages mark

This New Chapman Automatic Signal

With colored light indications

The indicating unit, for instance, is quite separate from the locked box containing the mechanism.

The lights may be placed where best seen by the motorman while the mechanism can be near the ground for convenient inspection or adjustment.

Two 50 Watt lamps behind each lens, on independent circuits, give full protection against light failure. The lenses are so arranged that they do not appear lighted when the sun shines on them.

A "counting in" and "counting out" feature permits of any number of cars being safely operated through the blocks. Should two opposing cars pass the contactors simultaneously, one gets a "clear" indication and the other a positive "danger" indication.

Write us and get the
full story.

Charles N. Wood Co.
948 Old South Building
Boston, Mass.

Rustless
Less Weight

ALUMINUM RIGID CONDUIT

Saves weight

Aluminum conduit weighs about one-third as much as ordinary metal conduit; it is easy to install and each length bears the Underwriter's Laboratories label.

Aluminum conduit, $\frac{3}{4}$-in. size, runs $2\frac{1}{2}$ ft. per lb. It saves weight and at the same time gives longer service due to its resistance to rust and corrosion.

See our exhibit of conduit, tubing, sheet, castings, etc., for light-weight car construction at Space 308, A.E.R.A. Convention—or mail coupon.

Aluminum Company of America
Pittsburgh, Pennsylvania

OFFICES

Albany
Boston
Buffalo
Chicago
Cleveland
Dayton
Detroit
Indianapolis
Kansas City
Minneapolis
New Haven
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New York
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Pittsburgh
San Francisco
St. Louis
Washington, D. C.
Export Sales
New York

Aluminum Company of America

Gentlemen:

I am interested in aluminum for..

....

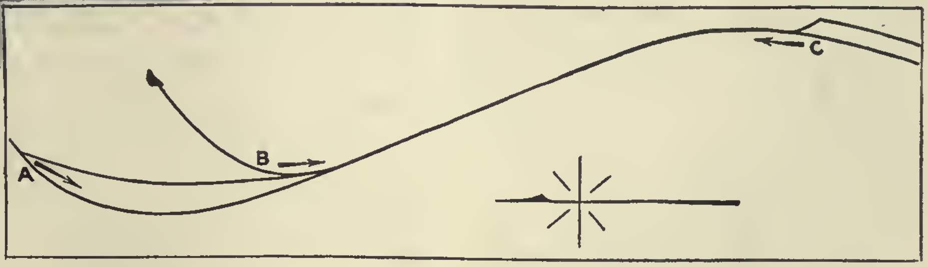
Please send ☐ Representative.
☐ Information.
☐ Sample.

RJ

....

....

Please mail Coupon to nearest office.

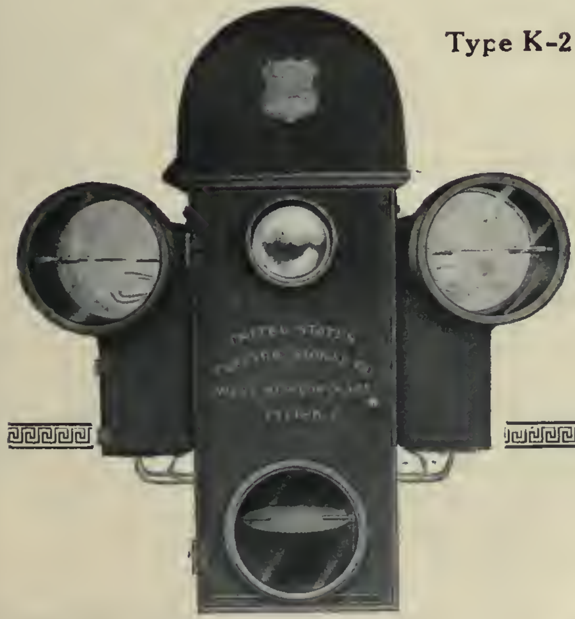


U.S. Electric Signals
on Portland Railway Light
& Power Co.

Adaptability, reliability and low maintenance shown on the railway

Typical installations of United States Electric Signals are shown above. The diagram illustrates only one of several complicated operating conditions and track lay-outs, where these almost universally applicable signals are performing satisfactorily, their proper function of safeguarding car movements.

Their reliability and low maintenance requirements are clearly indicated by the Portland Railway Light & Power Company's own records — 13,393 movements per signal failure, was their average for the year 1922. One man takes care of the 91 United States Electric Signal installations, and handles other repair and emergency work along the lines as well.


Type K-2

Type K-2 most widely used

In recent years the Type K-2 Signal has been most in demand. Its double-stop indication—red light for night and red disc for daylight—makes observation by the motorman certain. 5-inch signal lenses, and 8-inch discs. Duplicate lamps for visual signals, one held in reserve by means of pick-up magnet, provide certain service even if one lamp burns out.

United States Electric Signal Co.
West Newton, Mass.
REPRESENTATIVES:
Western: Frank F. Bodler. Monadnock Bldg., San Francisco, Calif.
Foreign: Forest City Electric Service Supply Co., Manchester, Eng.

Western

Everything Electric

Electric

Stocked Where the Street Railways Centre

In every section where street railway trackage runs into high figures there is a Western Electric Distributing House ready to serve their needs—practically a department store carrying electrical goods.

That Distributing House can provide everything to construct and maintain the transmission lines, everything for lighting cars, stations, buildings and yards, a full line of motors and control for the shops and complete equipment for intercommunicating systems.

This service is complete because the House acts as distributor for over a hundred nationally known manufacturers, who collectively make these lines and everything for safety, continuity of operation and efficiency.

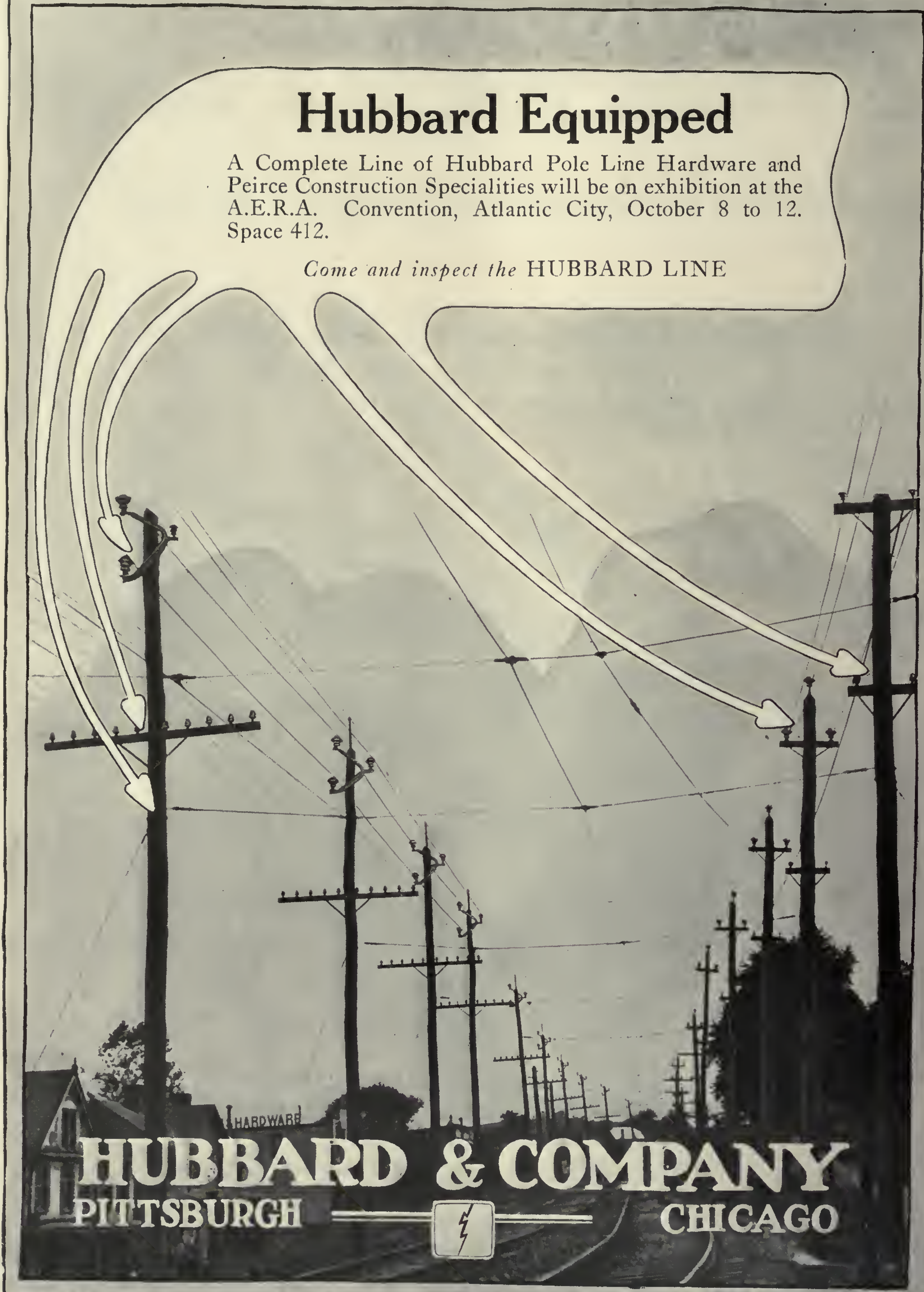
There are natural and obvious economies in a system capable of providing quickly everything electrical on one and the same order.

The complete service with its economies and savings of time are obtainable at our nearest House.

A
NATIONAL
ELECTRICAL
SERVICE

Western Electric Company

OFFICES IN ALL PRINCIPAL CITIES

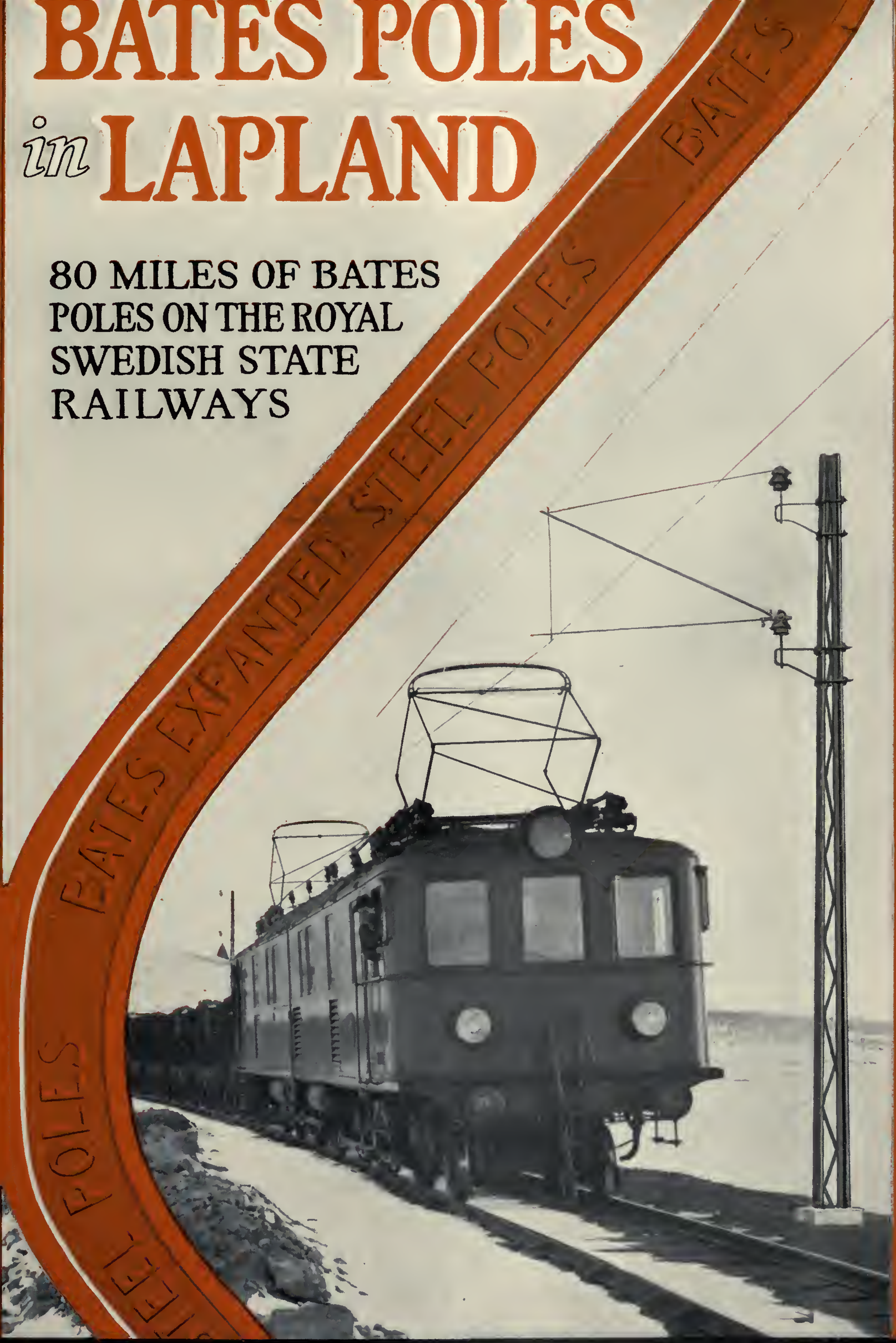

Hubbard Equipped

A Complete Line of Hubbard Pole Line Hardware and Peirce Construction Specialities will be on exhibition at the A.E.R.A. Convention, Atlantic City, October 8 to 12. Space 412.

Come and inspect the HUBBARD LINE

BATES POLES *in* LAPLAND

80 MILES OF BATES
POLES ON THE ROYAL
SWEDISH STATE
RAILWAYS



BATES ONE PIECE EXPANDED POLES

A Pole Every Two Minutes!

The Bates American Plant at East Chicago has a capacity of a pole every two minutes! Special rolled "H" sections are the raw material for Bates Poles, and a tremendous tonnage of Bates "H" sections are constantly carried in stock.

The sections are cold sheared by an enormous rotary shear, seen to the right, then taken directly to the furnace charger.

The sheared and heated beams are drawn endwise from the furnace, and automatically charged into the expander.

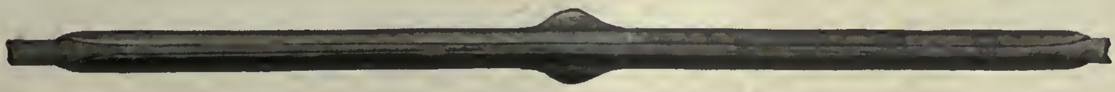
The expander shown to the right grips the flanges and expands the beam under tremendous power. The act of expanding the beam elongates the web portion between the points of unsheared intact, creating, without waste of material, a perfect Bates One-piece Truss.

The expanded pole is drawn from the expander onto slowly moving cooling chains, sent through a mechanical straightener, cleaned, and when cooled to about 200 degrees, painted. By the time the pole has become cool, the paint is thoroughly dry and the pole is ready for shipment. It is significant to witness the economical rapidity of the Bates system of steel pole manufacture!

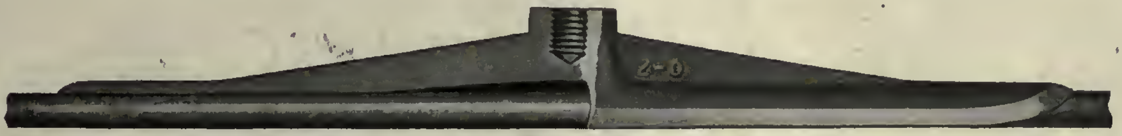
BATES ONE PIECE EXPANDED POLES

DREW CUSHION EARS

For "real service" with round trolley wire



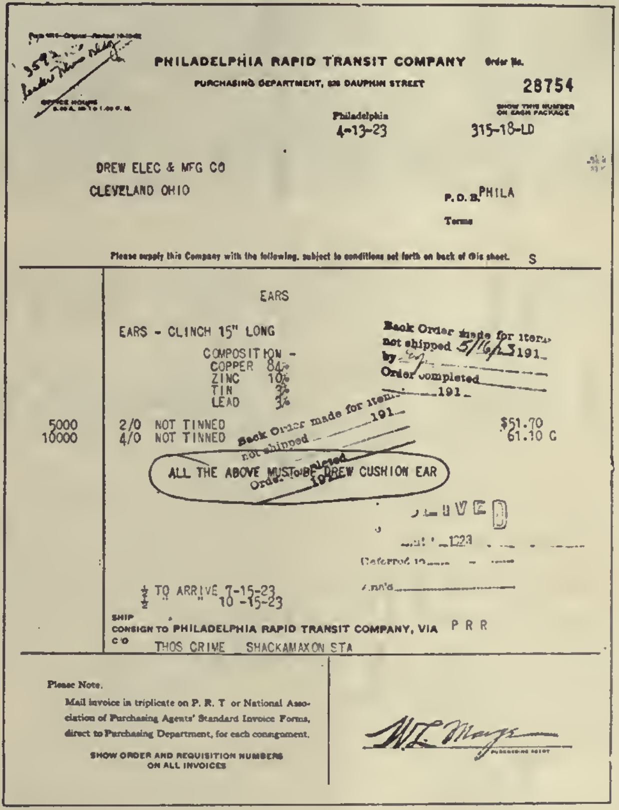
A machined smooth underrun from trolley wire to ear and back to the trolley wire



Six inches of cushion under the boss saves your trolley wire

DREW CUSHION EARS

will save your trolley wire and give you lower trolley maintenance costs, too.



PHILADELPHIA RAPID TRANSIT COMPANY Order No.
PURCHASING DEPARTMENT, [illegible] DAUPHIN STREET 28754
SHOW THIS NUMBER ON EACH PACKAGE
Philadelphia 4-13-23 315-18-LD

DREW ELEC & MFG CO
CLEVELAND OHIO
F. O. B. PHILA
Terms

Please supply this Company with the following, subject to conditions set forth on back of this sheet. S

EARS

EARS - CLINCH 15" LONG
COMPOSITION -
COPPER 84%
ZINC 10%
TIN 3%
LEAD 3%

5000	2/0 NOT TINNED	$51.70
10000	4/0 NOT TINNED	61.10 C

ALL THE ABOVE MUST BE DREW CUSHION EAR

Back Order made for items not shipped 5/16/23 191_
by
Order completed ______191_

Back Order made for items not shipped ______191_
Order completed 192_

½ TO ARRIVE 7-15-23
½ " " 10-15-23

SHIP CONSIGN TO PHILADELPHIA RAPID TRANSIT COMPANY, VIA P R R
C/O THOS CRIME SHACKAMAXON STA

Please Note.
Mail invoice in triplicate on P. R. T or National Association of Purchasing Agents' Standard Invoice Forms, direct to Purchasing Department, for each consignment.
SHOW ORDER AND REQUISITION NUMBERS ON ALL INVOICES

W. L. Mayer
PURCHASING AGENT

DREW CUSHION EARS

speak for themselves in service. Why not try them and "know" from experience the best ear?

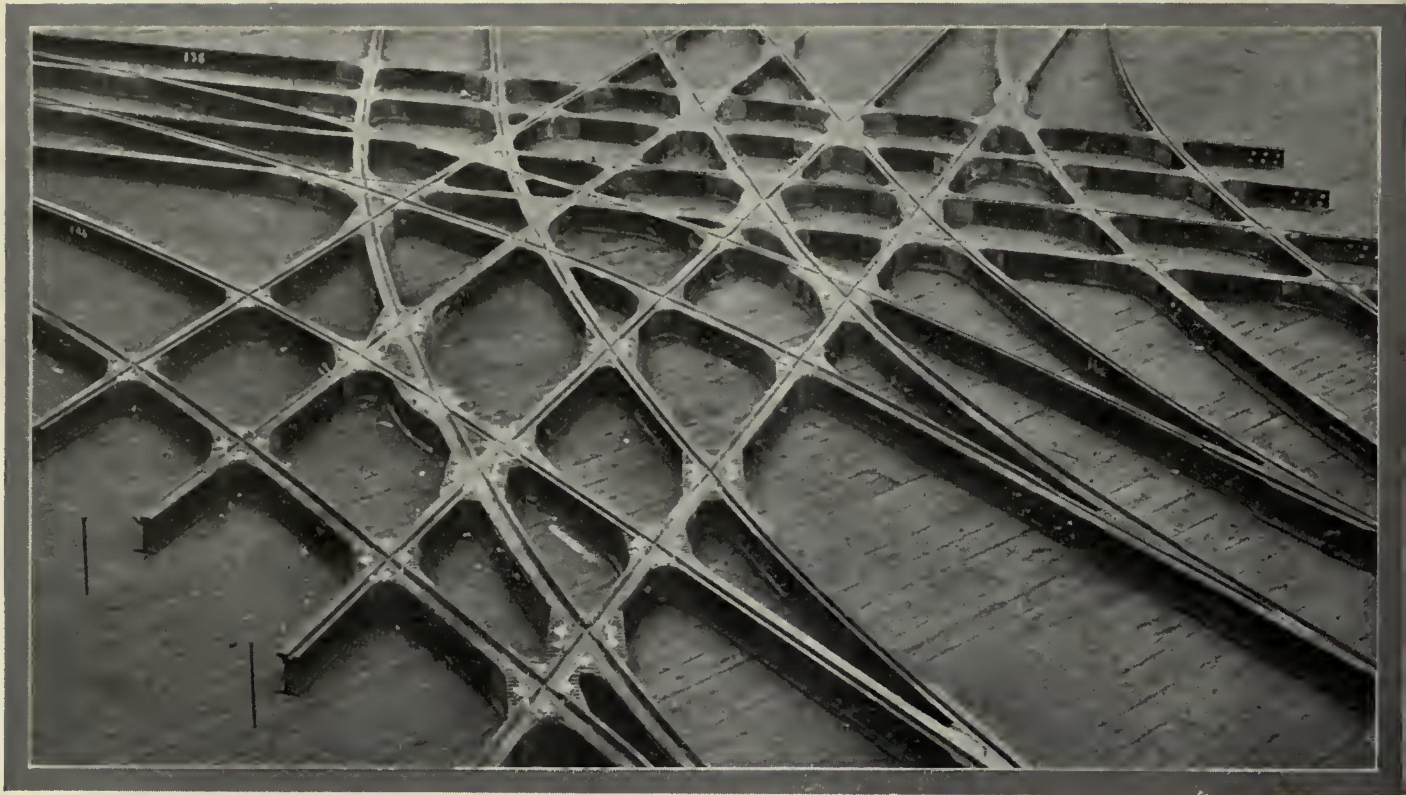
The groove of the DREW CUSHION EAR is made deeper in the center for a distance of six inches under the boss as illustrated above. This construction provides a CUSHION EFFECT, which prolongs the life of the ear lips under the boss and gives full protection to your trolley wire for the life of the ear.

The lips of the DREW CUSHION EAR are smoothly machined (not rough ground)—making the trolley approach smooth and without-jar. The DREW CUSHION EAR forms the smoothest underrun of any ear now on the market.

All points considered, the DREW CUSHION EAR is the lowest priced ear. It also gives "real service" and "real economy." Actual service in your trolley line will tell the story better than words.

The Drew Electric & Manufacturing Co.

Cleveland, Ohio



Special Track-work is a Buda Specialty

On complicated layouts and unusual track-work as well as regular track-work the name Buda is your guarantee of highest quality. Buda standard equipment for city railway tracks, in common with Buda Special Work, includes the most advanced designs of the modern types, including solid manganese and manganese center construction.

Because of the Buda reputation, special track-work has become a Buda specialty. Long life and low maintenance characterize Buda track-work service everywhere.

THE BUDA COMPANY
HARVEY (Chicago Suburb) ILL.

BUDA
ESTABLISHED
1881

The
UNA JOINT

This important development is the result of:

1. Scientific and engineering investigation of the requirements of seam welded joints.
2. Improvements in the joint structure; methods of welding and the metallurgical control of seam metal.
3. Determining of methods of testing the essential characteristics of these joints.
4. Comparative practical tests of welded joints by means of a special rail joint testing machine.

The UNA Joint will be publicly shown for the first time at the Atlantic City Convention, Space 201.

Rail Welding & Bonding Company
Cleveland, Ohio

Manufacturers of the well-known
UNA BONDS

CHECK UP

Ask yourself:

☐ Are we endangering our entire track structure by lack of adequate attention to the condition of rails and special work?

☐ Are we allowing costly special work to go to pieces before its time, for lack of timely and proper repairs?

☐ Are we letting cupped joints or broken special work jolt and batter the life out of our brand new cars and shorten the remaining years of our old ones?

☐ Are we rattling and shaking our passengers on corrugated rails?

☐ Are we using modern, fast working, labor-saving equipment in our track maintenance work?

☐ Are we realizing to the fullest extent, the possibilities of welding and grinding as means of retarding depreciation?

BUILD-UP!

Preservation postpones reconstruction

Timely repairs and adequate maintenance on rails and special work will delay the necessity of costly rebuilding and rehabilitation.

At our Convention Exhibit we'll have our full line of Railway Track-work Equipment to show you.

"AJAX!" The light weight, high-capacity, portable electric arc welder.

"ATLAS!" The high-speed, low-cost rotary grinder, invaluable for following up welding operations.

"UNIVERSAL!" The most complete, and generally useful rotary track grinder available. We want to explain its peculiarly valuable features.

"RECIPROCATING!" The Old Reliable efficient machine for corrugation removal.

"HERCULES!" The radial swing-frame grinder that does anything a flexible shaft outfit can do but eliminates the disadvantages of that type. Grinds at any angle, light, quick-portable, sturdy, moderately priced.

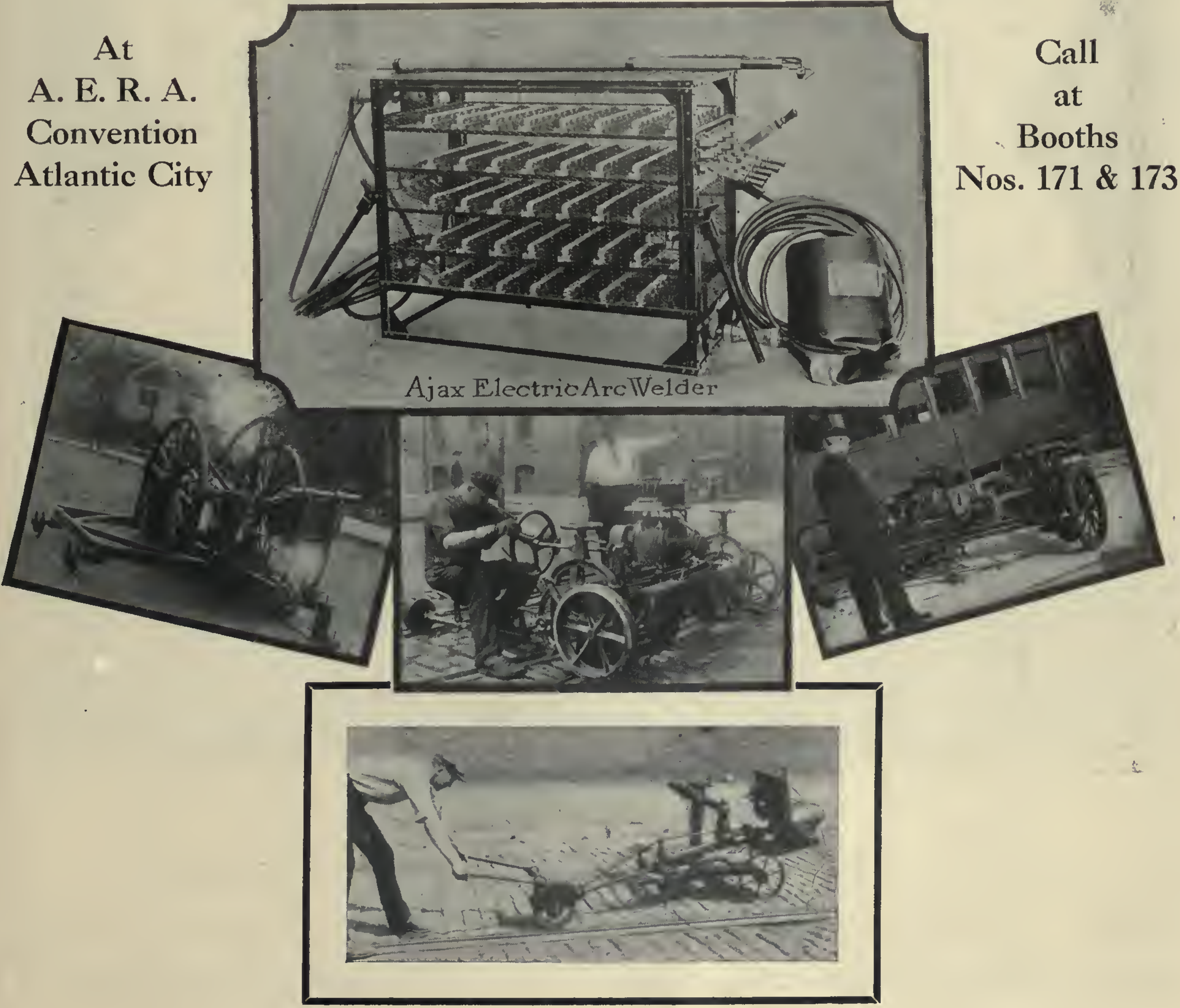
Investigate them all at close range!

RAILWAY TRACK-WORK COMPANY
3132-48 *E. Thompson St., Philadelphia, Pa.*

Agents: Chas. N. Wood Co., Boston; Electrical Engineering & Mfg. Co., Pittsburgh; P. W. Wood, New Orleans; Atlas Railway Supply Co., Chicago; Walter M. Graham, Toronto; Equipment & Engineering Co., London.

At
A. E. R. A.
Convention
Atlantic City

Call
at
Booths
Nos. 171 & 173



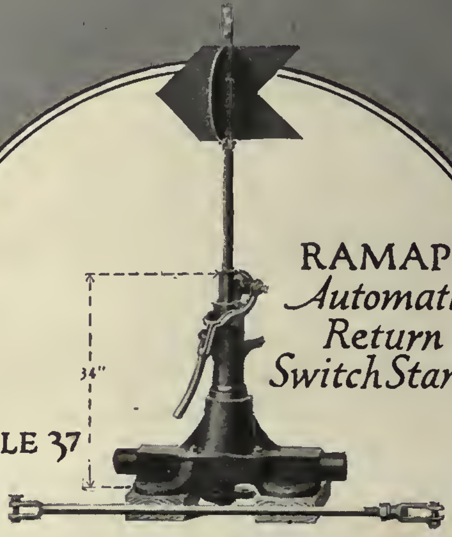
Ajax Electric Arc Welder

RACOR
TRADE MARK
REGISTERED

Automatic Switch Stands

RAMAPO
Automatic Safety Switch Stand

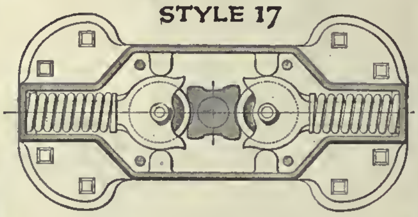
STYLE 17



RAMAPO
Automatic Return Switch Stand

STYLE 37

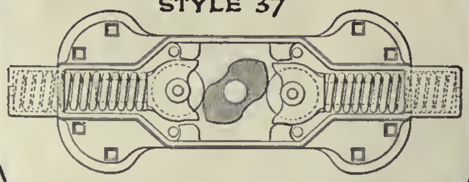
A Sectional View of
AUTOMATIC SAFETY
Switch Stand
STYLE 17



Below Cover Plate Showing Automatic • Mechanism •

These Switch Stands also furnished in medium Heights • and • Dwarf Styles

A Sectional View of
AUTOMATIC RETURN
Switch Stand
STYLE 37



Below Cover Plate Showing Mechanism • Half Thrown • Automatically

TEE RAIL SPECIAL WORK *for* INTERURBAN LINES *and* PRIVATE RIGHTS OF WAY

Manganese Construction
Street and Steam Crossings a Specialty

RAMAPO AJAX CORPORATION, HILLBURN, NEW YORK

2503 Blue Island Ave. CHICAGO	30 Church Street NEW YORK
McCormick Building CHICAGO	NIAGARA FALLS, N. Y. SUPERIOR, WIS.

Canadian Ramapo Iron Works, Limited, Niagara Falls, Ont.

BARBOUR STOCKWELL

SPECIAL TRACKWORK
for STREET RAILWAYS

Switches
Mates, Frogs and Crossings
Curves, Turnouts, Cross-Connections
and Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

Good trackwork and good profits

They're very closely connected when you come to figure it out. Good trackwork wears evenly and long. Besides costing less to maintain, its smooth surface makes a big difference to the comfort of your passengers—and the more comfortable you make your passengers the more they ride.

Consult Barbour-Stockwell

BARBOUR, STOCKWELL CO.

205 Broadway *Established 1858* **Cambridge, Mass.**

BETHLEHEM Frogs, Switches, and Special Trackwork are produced in a separate department specially equipped for the manufacture of this product. This special department is backed by all the steel-producing, metallurgical, and engineering facilities of the Bethlehem Steel Company, assuring correct design and high quality in materials.

The carhouse layout shown above completely assembled under cover is a graphic illustration of quality in workmanship. Men working under cover are comfortable, and can produce better work and more of it. Layouts completely assembled and fitted under cover before shipment mean less labor in installation.

A partial list of Bethlehem products for the electric railway field includes rails, splice bars, bolts, spikes, tie plates, tie rods, pole line material, and rolled steel car wheels and axles.

See the Bethlehem Exhibit of Trackwork, Car Wheels and Oil Burning Equipment, at the Annual Convention of the American Electric Railway Association, Atlantic City, October 8 to 12, Space Nos. 562 to 567.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

Sales Offices:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh
Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

THE
LORAIN STEEL
COMPANY

Girder Rails **Special Trackwork**

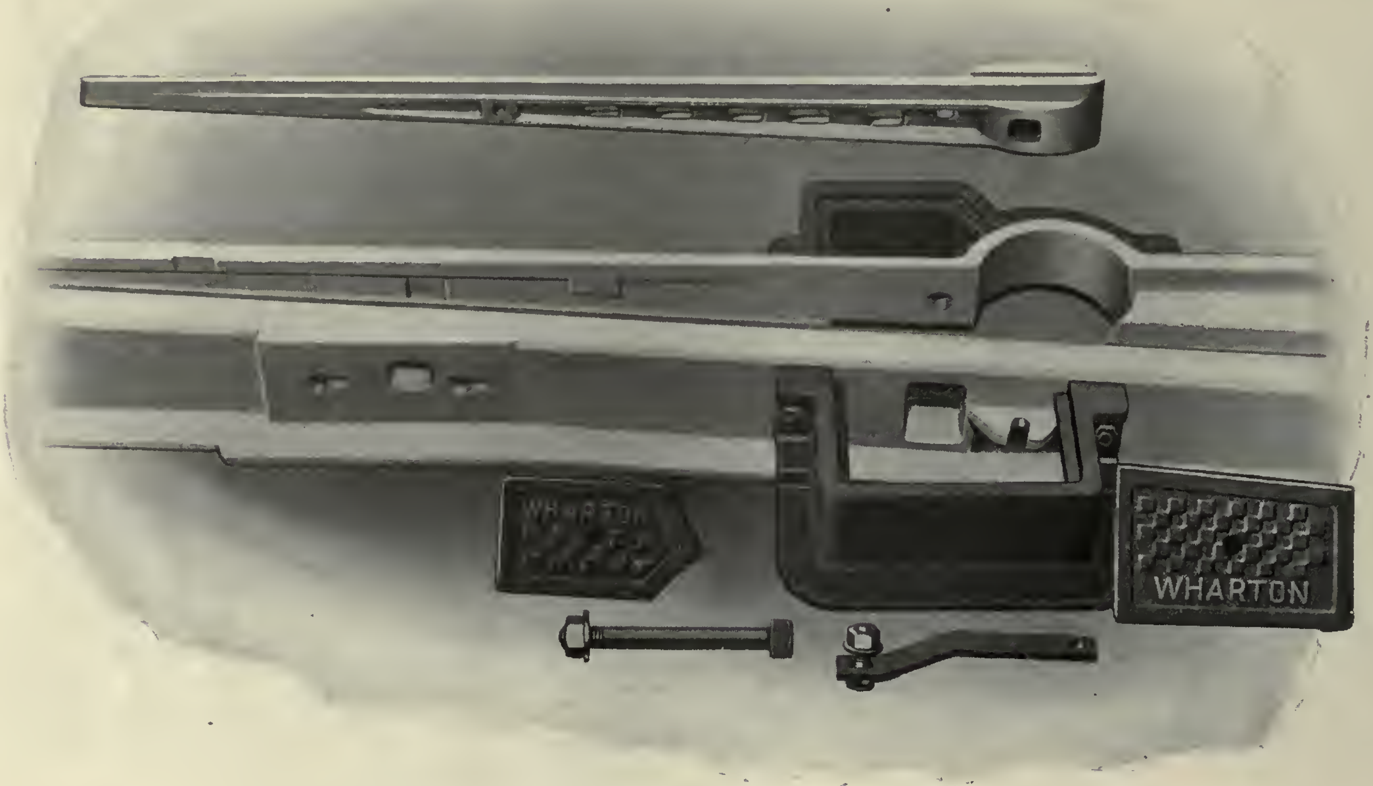
You are invited to examine our Girder Crossing on exhibition at spaces 546-7-8 and 9 on the Pier.

The distinctive features of this design are the continuous flange bearing provided by the use of a specially designed shallow grooved rail which fishes up with the A.E.R.E.A. Standard sections.

And the wearing plates of Alloy Steel, which first of all are hardened and toughened by heat-treatment, and are adapted to building up in the street by welding when worn.

The Lorain Steel Company
General Offices: Johnstown, Pennsylvania
Sales Offices:
Atlanta Chicago Cleveland New York Philadelphia Pittsburgh
Pacific Coast Representatives: U. S. Steel Products Co., San Francisco, Seattle, Portland, Los Angeles
Export Representatives: United States Steel Products Co., New York

BENEFIT BY THE RESOURCE



Slanting Bed Tongue Switch
(Patented)

Switches—Mates—Frogs—Crossings
Layouts
of all types and constructions

Originators of
MANGANESE STEEL TRACKWORK

WHARTON TRACKWORK

OF A PIONEER ORGANIZATION

The master-minds of railway operation have chosen

Wharton Trackwork

Their precedent is your guarantee

THIS Slanting Bed Switch, which is a somewhat radical departure from designs now on the market, will be exhibited at the A.E.R.A. Convention in Atlantic City, N. J.—Booths Nos. 588 and 589.

Illustrations with descriptive details will there be distributed or we will gladly mail them on request.

Note the strong, deep I beam section tongue, presenting an uninterrupted surface in one plane, giving a continuous bearing on the machine ground bed, for its entire length.

Note the novel heel tightening device, on the principle of a split collar or clamp, insuring a snug fit of the circular heel portion or pivot of the tongue.

WM. WHARTON JR. & CO., Inc.
EASTON, PA.

SALES OFFICES:
Boston, Mass.
Chicago, Ill.
Denver, Colo.
New York City
Philadelphia, Pa.
Pittsburgh, Pa.
San Francisco
Scranton, Pa.

WHARTON TRACKWORK

Making a Good

See it at our
Booth, Numbers 108-110,
at the Convention!

DAYTON

Tie BETTER

The principle of the Dayton Resilient Tie has remained unchanged since its first use more than twelve years ago. Service records on scores of properties have demonstrated that the principle is correct.

There have been occasional improvements in construction. The latest one unifies the entire steel frame work of the tie into one piece and provides a heavy steel container for the resilient elements.

The Dayton
Mechanical Tie Co.
707 Commercial Building, Dayton, Ohio

Canadian Representative:
Lyman Tube and Supply Co., Ltd., Montreal, Quebec

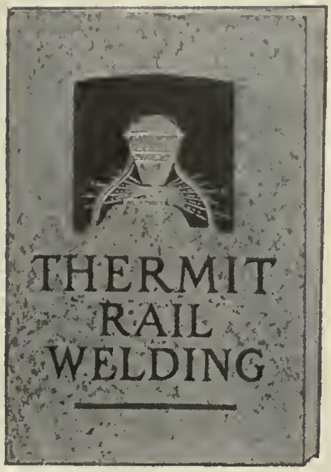
Resilient TIE

cushion the shock on the rolling stock

The last word in modern rail welding practice

Send for our new

THERMIT
RAIL WELDING
PAMPHLET



THERMIT
RAIL
WELDING

Tells all about the new improvements which have accelerated the speed of operation of Thermit rail welding and lowered its cost.

The whole subject of Thermit rail welding treated in detail. Well illustrated with explanatory photographs showing the simplicity of this method of absolutely eliminating rail jonts.

Contents include:

1—Thermit-Welding New Rail
2—Thermit-Welding Old Rail
3—Welding Thermit Compromise Joints
4—Constructing Thermit-Welded Frogs and Crossings
5—Thermit-Welding Broken or Loose Arms of Mates and Switches.
6—Discussion of the Theory of Rail Joints

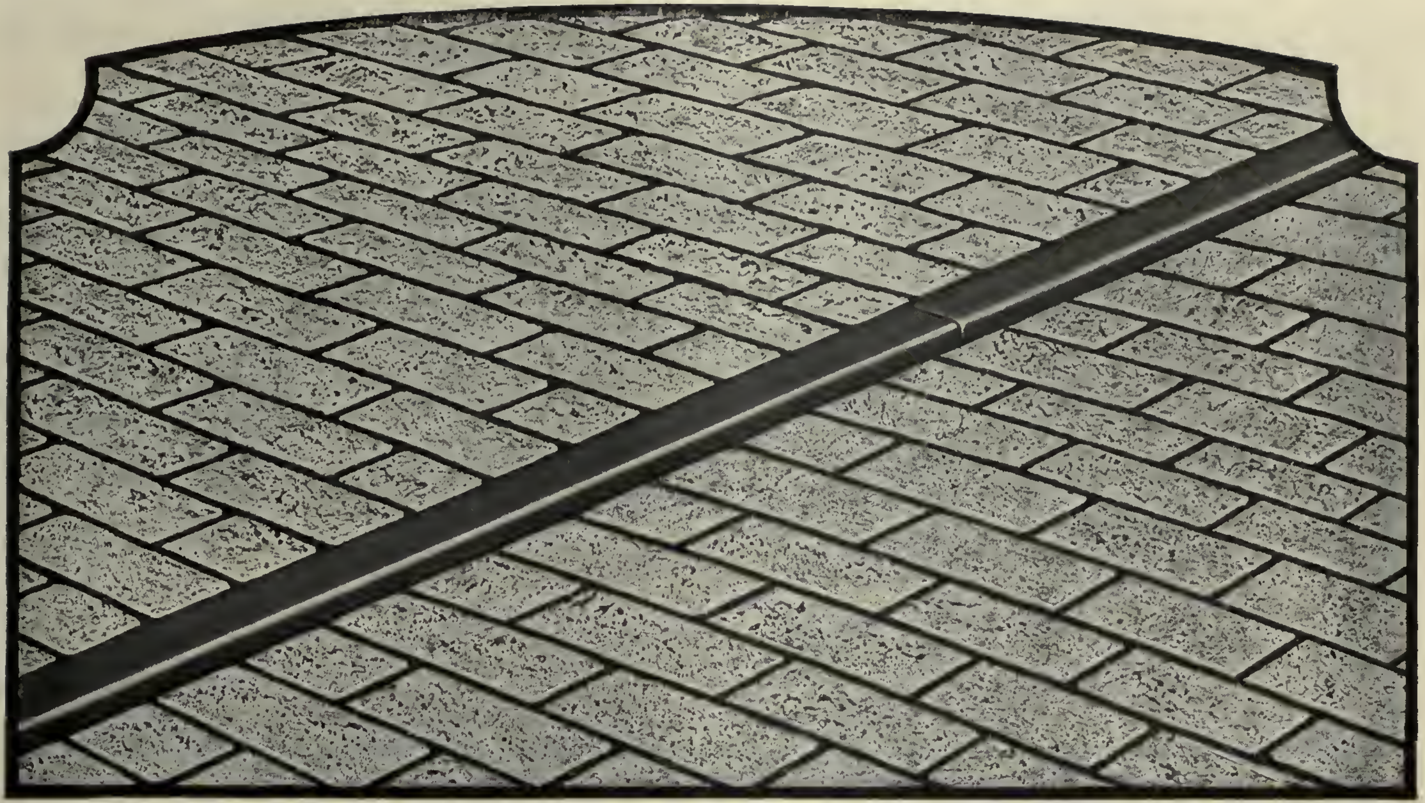
Look over our
Sample Thermit Rail Welds
Booths 116, 118, 120
A. E. R. A. Convention

High Production with Few Men

In Thermit rail welding only a few men can secure a high production per day. Many of our customers are Thermit-welding their rails at the rate of 18 to 20 welds per day with a single burner preheater, four men and a foreman. Other properties using seven men and a foreman and one of our double burner preheaters are securing a production of 35 to 40 welded rail joints per day. In other words, the production is at the rate of 4 to 5 welds per man per day.

Either advise us approximate number of joints to weld, also rail section number, so we can quote you by mail; or else let us send you a representative to go over the situation with you in detail.

Metal & Thermit Corporation
120 Broadway, New York
PITTSBURGH CHICAGO BOSTON S. SAN FRANCISCO TORONTO



WATER-TIGHT
—yet quickly removable

VITRIFIED paving brick with asphalt filler makes the ideal modern pavement in electric railway service.

The asphalt filler seals the joints and helps to form a water-tight surface which is not cracked by impact, expansion or contraction—no water seeps down to ties and cross-rods.

And when the need comes to replace a rail, a tie or a section of track, the individual bricks are readily removed and as easily relaid with 100% salvage value.

VITRIFIED
Brick
PAVEMENTS
OUTLAST THE BONDS

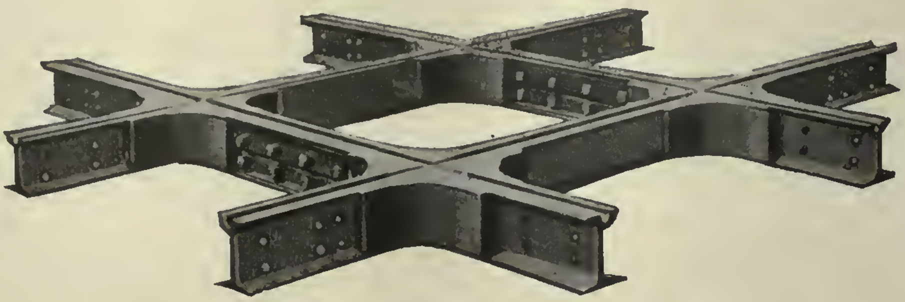
NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

Albion Shale Brick Company
Albion, Ill.
Alton Brick Company
Alton Ill.
Barr Clay Company
Streator, Ill.
Binghamton Brick Company
Binghamton, N. Y.
Cleveland Brick & Clay Company
Cleveland, Ohio
Clydesdale Brick & Stone Co.
Pittsburgh, Pa.
Coffeyville Vitrified Brick & Tile Co.
Coffeyville Kans.
Collinwood Shale Brick Company
Cleveland, Ohio
Corry Brick & Tile Company
Corry, Pa.
Francis Vitric Brick Company
Boynton, Okla.

Georgia Vitrified Brick & Clay Co.
Augusta, Ga.
Globe Brick Company
East Liverpool, Ohio.
Hammond Fire Brick Company
Fairmont W. Va.
Hocking Valley Brick Company
Columbus, Ohio.
Independence Paving Brick Co.
Independence, Kans.
Mack Mfg. Company
Wheeling, W. Va.
C. P. Mayer Brick Company
Bridgeville, Pa.
Medal Paving Brick Company
Cleveland, Ohio.
Metropolis Paving Brick Co.
Pittsburg, Kansas.

Metropolitan Paving Brick Co.
Canton, Ohio.
Mineral Wells Paving Brick Co.
Mineral Wells, Texas.
Moberly Paving Brick Company
Moberly, Mo.
Murphysboro Paving Brick Co.
Murphysboro, Ill.
Patton Clay Mfg. Company
Patton, Pa.
Peebles Paving Brick Company
Portsmouth, Ohio
Pittsburgh Paving Brick Company
Pittsburgh. Kansas.
Purington Paving Brick Company
Galesburg, Ill.
Southern Clay Mfg. Company
Chattanooga, Tenn.
Springfield Paving Brick Company
Springfield, Ill.

Sterling Brick Company
Olean, N. Y.
Streator Clay Mfg. Company
Streator, Ill.
Thornton Fire Brick Company
Clarksburg, W. Va.
Thurber Brick Company
Ft. Worth, Texas.
Toronto Fire Clay Company
Toronto, Ohio
Trinidad Brick & Tile Company
Trinidad, Colo.
Veedersburg Paver Company
Veedersburg, Ind.
Western Shale Products Company
Fort Scott, Kans.
Westport Paving Brick Company
Baltimore, Md.



High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE
CONSTRUCTION

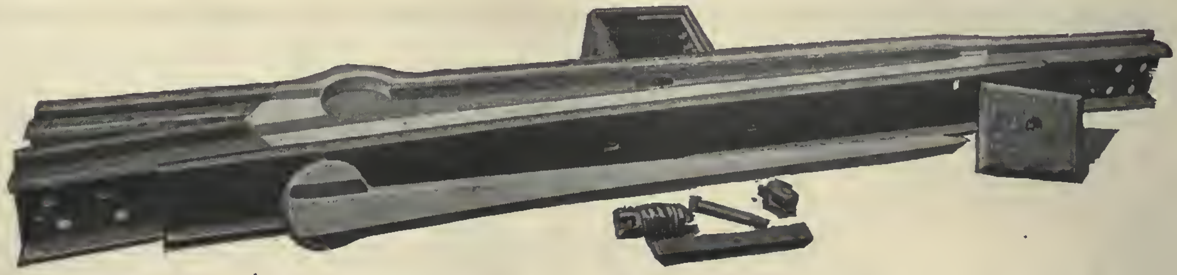
Lower operating costs follow track improvements

Faster operation, elimination of derailments, less wear and tear on cars—these are the logical results of replacing old worn-out special work with new and better quality lay-outs. And by specifying **NEW YORK SWITCH & CROSSING COMPANY'S** product, you are assured of a quality which will last longer.

For instance:— our Improved Anti-Straddle Tongue Switch is something which makes it practically impossible for a car to straddle a tongue. Whichever way it's thrown, the tongue locks securely in position.

Minimum maintenance work will be required on our special work, and longer life will be secured.

New York Switch & Crossing Co.
HOBOKEN, N. J.



280,000 Feet

of

Phono-Electric

Trolley Wire

That's San Diego's recent order, based not on first cost, but on a careful analysis of final economy, and Phono-Electric's practical advantages. A 53-mile order exemplifying the company's slogan: "The best street railway system in California."

Investigate!

Bridgeport Brass Company
Bridgeport Connecticut

"Bridgeport"
BRASS CO.
TRADE MARK

Phono-Electric

A tale of two

It wasn't so very long ago—the early Summer of 1769—that a mission of the Franciscan Friars was established near what is now the city of San Diego.

Those old monks formed the first Spanish colony in Upper California. Their bell echoed the call to Mass and Vespers across the unbroken stillness of Coronado Bay.

The mission passed into history, but San Diego grew. Soon came the railroad. Then the "City of Palms" had

bells in San Diego

a street car system of its own. And in September 1892 the first electric car was run on its tracks..... a double-deck single-truck affair!

Today San Diego, port of entry and center of vast citrus and fruit interests, boasts that it will possess "the best street railway system in California." Another bell is heard in its streets. The car-bell—less musical but nevertheless a sound that carries with it a cheerful reminder of prosperity and progress.

No more "broken wire" calls

Streets and crossings throbbing with life! Automobiles, street cars, trucks, jostling and gleaming 'neath the California sun! You can imagine the tie-up, the inconvenience and loss that a trolley wire break would cause in a city such as San Diego.

But San Diego is taking no chances. Fifty-three miles of Phono-Electric have been ordered. Fifty-three miles of wire that has double the tensile strength of copper and two to three times its life. The emergency crew won't get any more "broken wire" calls.

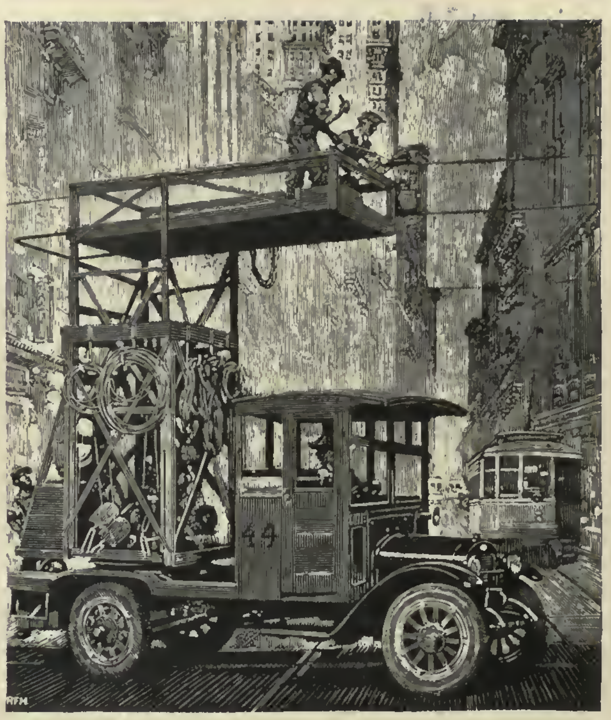
Call at our booth and investigate Phono-Electric records in hundreds of other large cities from coast to coast.

Phono-Electric

A. E. R. A. Convention—Atlantic City
Space 149 on the Pier

Bridgeport Brass Company
Bridgeport Connecticut

"Bridgeport"
TRADE MARK



One to Fifteen Tons Capacity

Whatever the hauling requirments may be, whether they necessitate a one-ton truck or a fifteen-ton tractor, GMC has a model to handle them to the best advantage. And every GMC model embodies new and exclusive features that assure more and better and more economical truck service.

GMC trucks produce more power and more speed at a smaller cost than has ever been possible before with any one truck.

More and More are electric traction lines coming to use motor trucks as auxiliary equipment; not only for repair work, but as "feeders" for both freight and passenger lines.

Years of enduring service are built into GMC trucks. They are made for hard work and plenty of it.

"GMC TRUCKS ARE SEVEN STEPS AHEAD"

GENERAL MOTORS TRUCK CO.—*Pontiac, Mich.*
Division of General Motors Corporation

In the Dominion of Canada
General Motors Truck Company of Canada, Limited, Oshawa, Ontario

General Motors Trucks

GMC

The Movement Toward Stee

WHEN an accumulation of experience seems to dictate a certain course of action, commendable conservatism holds back a certain proportion of any group from following immediately.

Good engineering judgment approves your proceeding with such caution when an innovation is under consideration, but on the other hand, if progress passes you, it may cost you and your company money.

Here, then, is the point in our review of the advancement steel ties have been making since you last investigated them. *We advise investigation from first-hand sources of the performance of Steel Twin Tie Track.*

It is our constant effort to facilitate this method of promoting the sale of our product, because when Steel Ties are adopted on the basis of the experience of others, obtained first-hand, we are secure in the belief that we have made a permanent business relationship.

What Happened in 1923

Fifteen Technical Articles describing methods of installation and performance of steel tie and concrete construction appeared in the past year.

Twenty-six new users of Steel Twin Ties made their first installation in the United States and Canada in 1923.

Steel Twin Ties on the
Cleveland Railway Co.

THE INTERNATIONAL STEE

Spaces 121-123-125 Machinery Hall

Ties is Accelerating Rapidly

To this end, to make convenient your consideration of Twin Tie Track, we are exhibiting a two thousand foot motion picture film at the Forty-second Convention of the American Electric Railway Association, just what you might have seen if you had visited five representative properties from Baltimore on the East to Detroit on the West during the track construction seasons of 1922 and 1923.

The motion picture camera has made a truthful record of all the details of track construction with steel ties as well as novel methods and labor-saving equipment used on these properties.

Plan to see the picture at the Convention and to find out *why* the movement toward Steel Ties is accelerating so rapidly.

The first shipments of Steel Twin Ties to be made via Panama Canal were loaded at Baltimore for San Diego and Portland, Oregon, in 1923.

The first method of efficiently reconstructing worn-out steel tie concrete base track was worked out on a main traffic artery in Cleveland. All the details are shown in our motion picture to be presented at the Convention.

In 1923 thirty-five per cent of our business came from users whose first installation is from five to twelve years old.

Steel Twin Ties on the Cleveland, Painesville and Eastern Traction Co.

Installing Steel Twin Tie Track under traffic, Kansas City, Mo.

TIE CO., CLEVELAND

Young's Million Dollar Pier, Atlantic City

MEETING
the track labor
PROBLEM

Upper view—starting cut in asphalt paving ahead of reconstruction crew with tie tampers fitted with special picks.

Lower view—breaking out old heavy concrete base with Ingersoll-Rand type CC-25 Paving Breakers.

PNEU

Paving Breakers

Better Labor Conditions

Shortage of common labor, demands for higher wages, and aversion to the heavier kinds of manual work hamper track-work programs. There is a "dignity of labor," which gives to men a certain pride in the job when given a powerful mechanical tool to use in place of aching muscles.

Equipped with Ingersoll-Rand Paving Breakers, about one-third the number of men are needed as compared with hand methods. For cutting concrete, brick, or asphalt paving, and for breaking out old concrete track foundations, progress is faster and costs are cut in half.

Ingersoll-Rand
General Offices:

Ingersoll-Rand

MEETING
the track labor
PROBLEM

MATIC
Tie Tampers

Better Labor Results

The same machines are used for tamping ties and back-fill ramming. With the untiring power of compressed air, a firm and solid bedding is secured which hand-tamping cannot equal. A gang of four men employing Pneumatic Tie Tampers will accomplish as much per day as three times their number tamping by hand.

Modern efficiency demands modern tools. Ingersoll-Rand Tie Tampers are used by nearly one hundred of the leading electric railway companies, as well as on the largest steam roads of the country.

Upper view—tie tamping crew rushing the job of track construction.

Lower view—cleaning out track prior to relaying paving.

Company
11 Broadway, New York

Ingersoll-Rand

A Million Dolla

Space

Telling "How t

Your COMPETITOR uses "Rubber Tires." Takes the "BUMPS" out of the road. Gives EVERY passenger a "JOY RIDE."

You use STEEL Wheels, and "BUMP the BUMPS" over ROUGH Track, taking "ALL THE JOY OUT OF LIFE."

The "Bump" Eliminated 1912

Before Reclaiming 1912

After and Now 1923

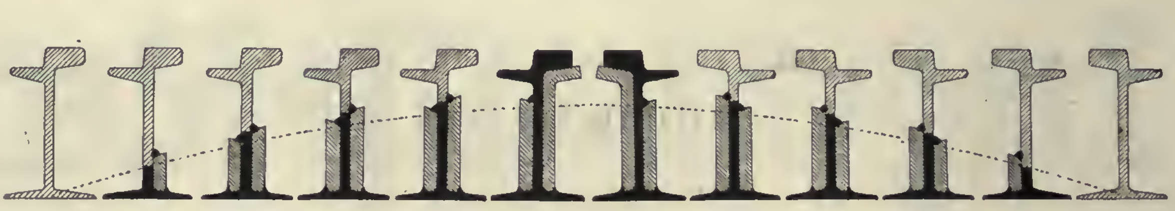
1912—Pioneer

Nothing better yet discovered, nor as universally and extensively used as

"Indianapolis" Economy Products, for Construction and Reclamation of Track Work and Equipment.

INDIANAPOLIS JOINTS
Require

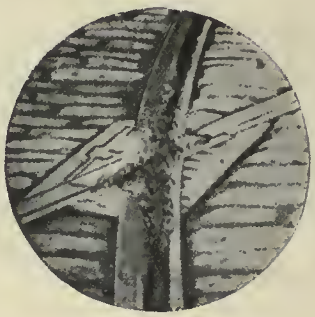
No Bolts
No Bonds
No Base Plates
No Maintenance



Recipe, on the Million Dollar Pier

108 and 110

Have and to Hold" Car Riders


A hard center frog
—badly battered.

What can you do?

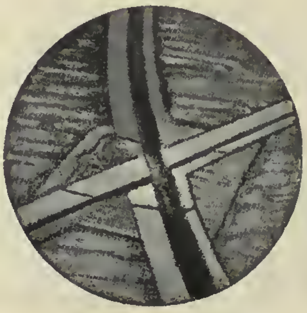
Here's the RECIPE.

TAKE THE "BUMPS" out of your track.

Then EVERYBODY will be SETTIN' PRETTY.

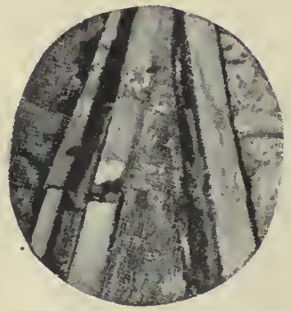
You can do this with
"Indianapolis Welded Joints" and "Indianapolis Electric Welding"

Since 1912, this has saved Electric Railways MILLIONS Annually.


The same frog
Indianapolis Welded.

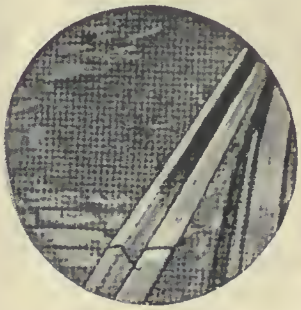
Leaders—1923

If you are interested in a
Jointless, Bondless, Costless Track
See our Exhibit, Get our Proposition. Then its up to you.


A broken mate—
almost scrap.

Manganese Successfully Welded with "Indianapolis." Heat-Treated Fluxated Electrodes.

They stand pre-eminently above anything yet produced in Welding Steels.


The same mate after our
Welder had finished
with it.

The Indianapolis Switch & Frog Co.

Springfield, OHIO

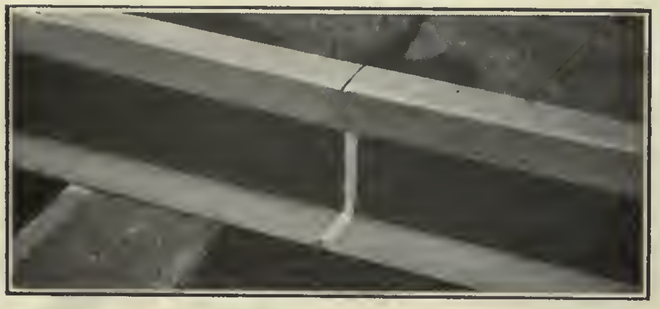
BOSTON, MASS.
201 Devonshire

ST. LOUIS, MO.
600 La Salle Bldg.

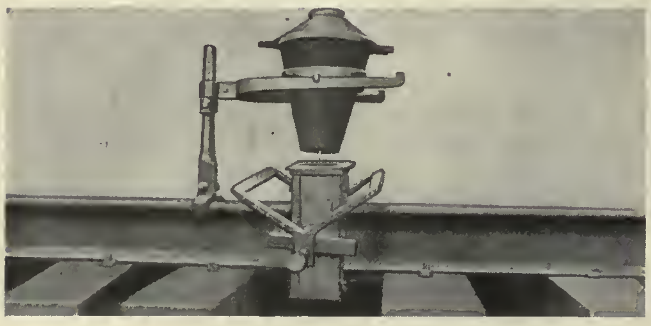
LOS ANGELES, CALIF.
Spring Street

SAN FRANCISCO, CALIF.
77 Natoma Street

FERALITE



The Start:— Rail ends are butted and lined up, then an opening is cut through the base and web, up to the rail head, using the oxy-acetylene torch.



The Process:— The molds are adjusted and clamped, the rail is heated to welding temperature, the aluminothermic reaction is carried out, and the superheated steel is tapped into the mold.

Finished Feralite Weld:— The result is a solidly fused pair of rails, as strong mechanically and as continuous electrically as any part of the original rail.

(At Indianapolis, Ind.)

If you want to know:

all the details, the cost, and the places where FERALITE has been used, write today. Ask for Booklet B.

ALUMINO-THERMIC
FERALITE
TRADE MARK
WELDING MIXTURE

The latest development in alumino-thermic welding process.

The advantages of this kind of weld over the ordinary rail joint are too well known to need enumeration. It lasts as long as the rail, does not cup, requires no maintenance and eliminates the expense of rail bonds. Of more interest to the well-informed railway man, is the fact that the **FERALITE Process** puts this type of weld on a practical basis—uniform, efficient and economical.

To meet the insistent demand of electric railway engineers for a uniform product and an economical process, as applied to aluminothermic welding of rail joints, this Company was formed to develop and market the **FERALITE Process.** We secured as Consulting Engineer, the famous Professor Hans Goldschmidt, known the World over as inventor of the aluminothermic process for welding iron and steel.

Features of Feralite

Foremost among the many purely mechanical advantages of the **FERALITE Process,** is the fact that nothing intervenes between the original rail heads. They are butted together and welded solid. This permits an absolutely correct alignment to be made, and eliminates the lack of uniformity which may occur if any other metal is introduced between the original rail heads. When welding old rails, it is not necessary to cut out any part of the rail head—the **FERALITE Process** cares for them as they are.

Uniformity of the mixture is insured when you use **FERALITE.** It is manufactured and mixed in our plant, under constant personal supervision of an expert in this process. Because of the use of nothing but highest grade pure materials, accurately portioned as to chemical contents and suitably mixed, **FERALITE** steel is free from impurities, blow holes, and hard spots, when poured into properly-prepared molds.

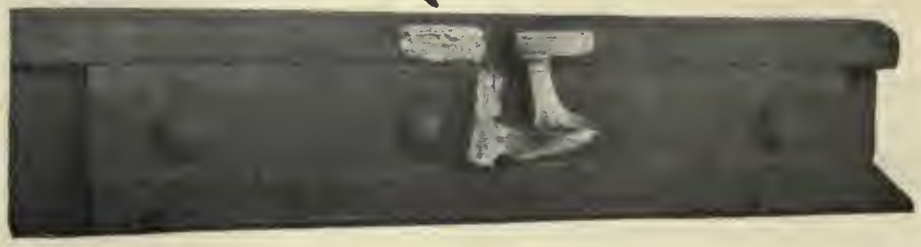
By means of the **FERALITE Process,** which butts the rail ends, there is little or no excess metal to be ground.

Crucibles and apparatus which we furnish are light in weight, but amply strong. Our special rail crucible holder, shown in the illustration, is designed to permit quickest adjustment and centering.

When it comes to *costs,* we are prepared to show you that there is a possibility of real economy in aluminothermic welding. Our equipment is inexpensive, but practical and rugged, and you will find our scale of prices on **FERALITE** portions most attractive.

ALUMINO-THERMIC CORP.

Roselle Park, N. J.



Conductivity

Brazed Bonds

Are foremost in conductivity. The full size copper conductors are united to the rail in a brazed union which offers the least resistance possible. The

Eight to one ratio

of steel rail surface to copper bond terminal, found in no other bond, permits the unrestricted passage of all the current that the copper conductor will carry.

Type ET Brazed Bond

ERICO

Look at the bond terminal contact above. Note the large area of contact on the rail. Remember also that this large area means strength in addition to permanent conductivity.

In fact, we guarantee that when our Brazed Bonds are properly applied, the terminals cannot be detached from the rail except by actual mutilation.

The Electric Railway Improvement Co.
Cleveland, Ohio, U. S. A.

ERICO BRAZED BONDS

American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDER
TRIPLEX

Arc Weld and Flame Weld

Send for new
Rail Bond Book

American Steel & Wire Company
CHICAGO
NEW YORK

AMERICAN ELECTRICAL WORKS
AMELECTRIC
Wires and Cables
PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.
Boston, 176 Federal; Chicago, 112 W. Adams;
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Shaw Lightning Arresters

Standard in the Electric Industries
for 35 years

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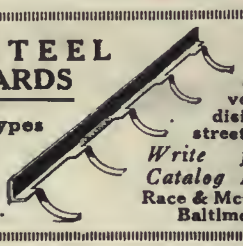
GODWIN STEEL PAVING GUARDS

Adapted to all types of rails and paving.

W. S. GODWIN CO., Inc.

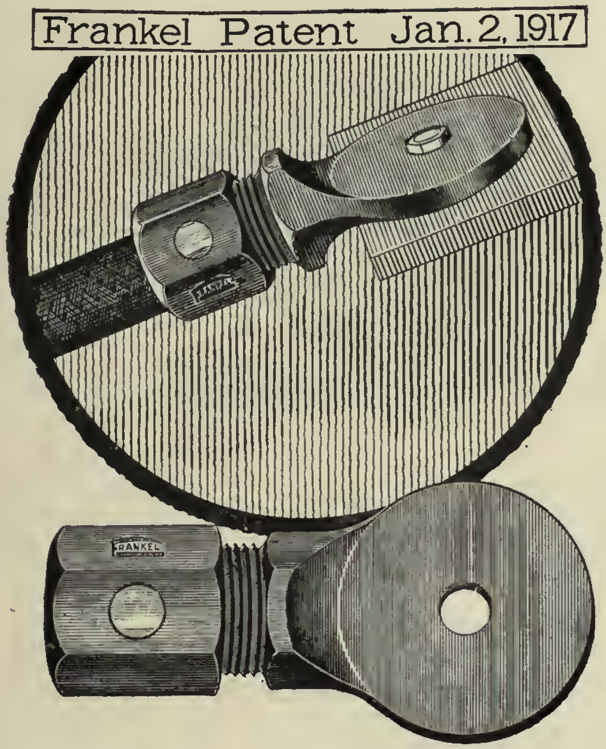


Proven by service to economically prevent seepage and disintegration of street railway paving.

Write for Illustrated Catalog No. 20.

Race & McComas Sts.,
Baltimore, Md.

Frankel Patent Jan. 2, 1917



Frankel
SOLDERLESS
BACK CONNECTOR LUGS

speed the power or substation work and make a better job.

The most convincing test of these Frankel Solderless Connector Lugs is to compare their performance with the old fashioned soldered lug. Overload your cable to the same extent you are liable to under extreme service conditions and observe the results. The solder will melt and run out of the soldered lug but the FRANKEL WILL HOLD AS SECURELY AS WHEN COLD.

Send for full particulars.

Frankel
Solderless Connectors

Westinghouse Elec. & Mfg. Co.
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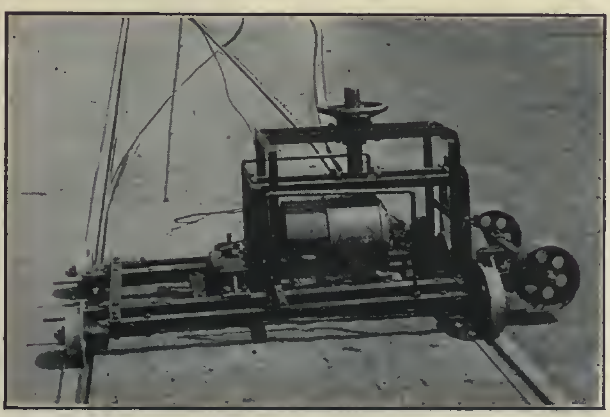
Offices in All Principal Cities

RAIL
SEYMOUR
GRINDERS

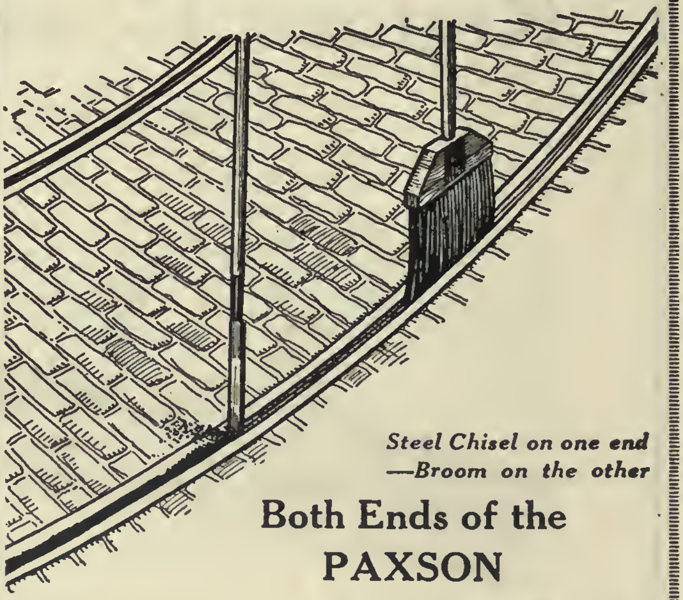
Why the MIDGET is popular

Appeals to the practical trackman because it is light and fast, because it will do any kind of grinding, and, last but not least, because it is inexpensive to purchase and economical to operate.

E. P. Seymour Rail Grinder Co.
Waltham, Mass.



GET OUT, DIRT!



Steel Chisel on one end
—Broom on the other

Both Ends of the PAXSON Track Broom are *Business* Ends

—for which reason they have been the choice of railway men for 25 years.

Made of flat steel spring wire. Fits frogs, switches and grooves. Has strong ash handle with steel chisel on other end. Broom is light in weight but strong in construction. Send for a sample—you will be pleased.

J. W. PAXSON CO.
J. W. PAXSON CO.
Manufacturers
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Big saving at small cost

Roller-Smith BOND TESTER

It **pays** to keep rail bonds in good condition. The smallest leak is too expensive and an unnecessary drain upon your power bill.

You can locate the bad bonds quickly and at little expense with the Roller-Smith BOND TESTER. This compact portable equipment is simple to operate and facilitates quick, accurate readings. One man can test out several miles of track per day. Saw-tooth contact teeth bite into rail head insuring quick readings.

Watch your Rail Bonds.

The portable, "one-man" tester that is accurate, simple, rugged and reliable.

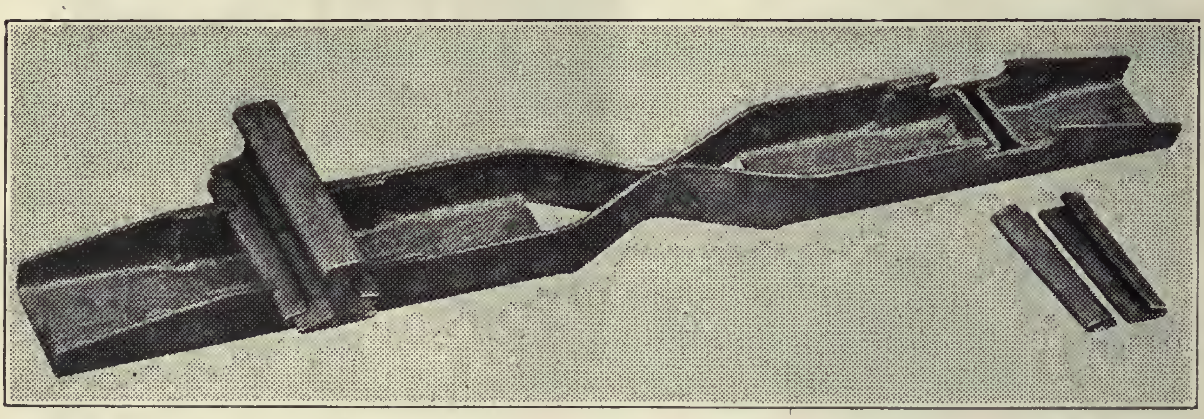
Write for descriptive Bulletins G-200 and G-201

ROLLER-SMITH COMPANY
Electrical Instruments, Meters and Circuit Breakers
2128 Woolworth Bldg. NEW YORK
Works BETHLEHEM, PA.
Offices in Principal Cities in U. S. and Canada

Reduce Roadway Expense!

Use Metal Safety Ties

Competing initial cost, less upkeep, simpler construction, longer life, safer track



Types for closed and open track — No spikes, tie plates, anchors, or braces required.

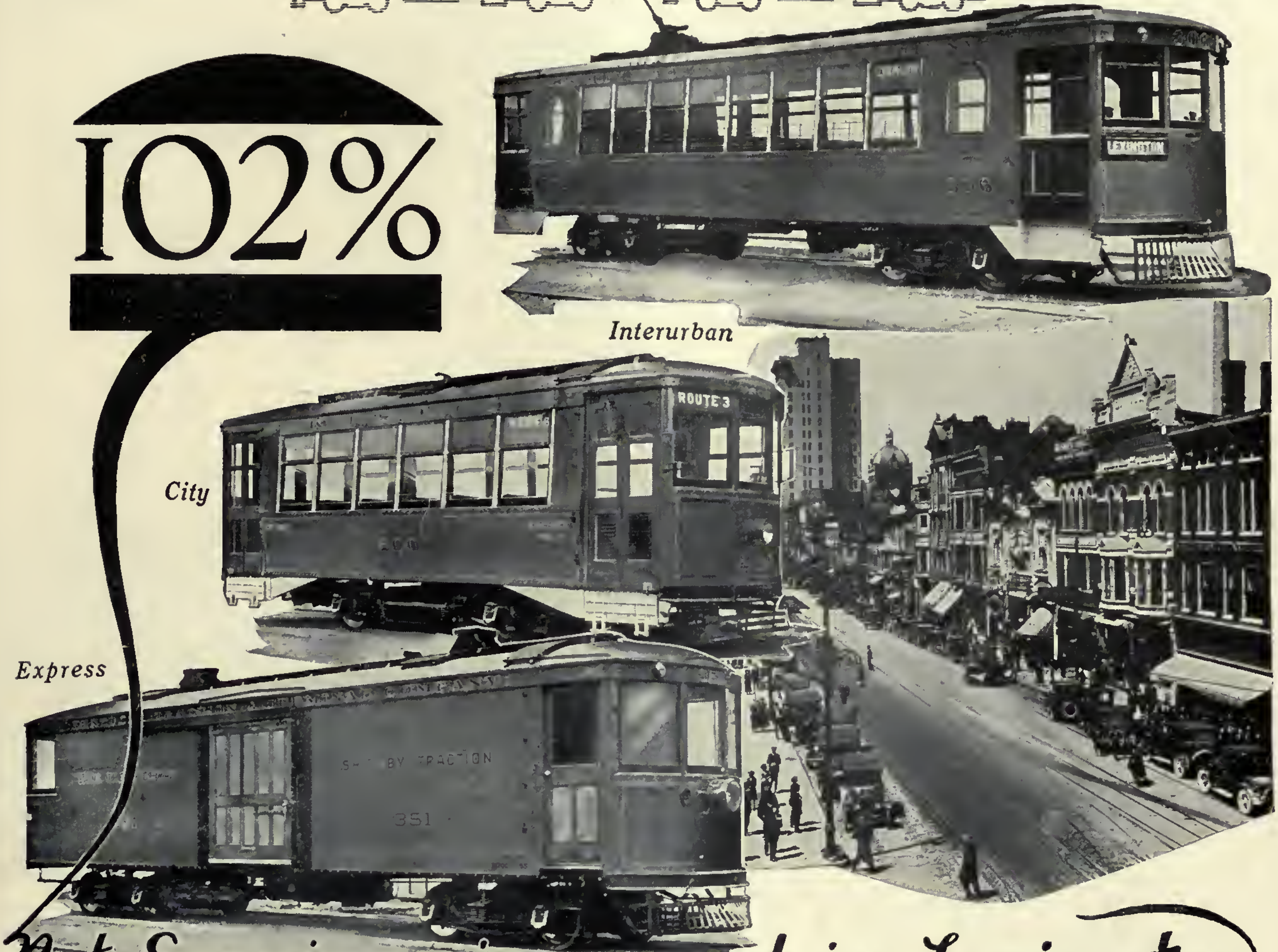
Don't fail to see our exhibit at
American Electric Railway Convention Exhibit, Atlantic City, Oct. 8th to 13th, 1923
Booth 646

Descriptive literature and quotations upon request.

Metal Safety Railway Tie Co., 522 North American Bldg., Philadelphia, Pa.

LIGHT WEIGHT

102%



Net Earnings increased in Lexington

Results of Light-Weight Operation	
Net Revenue increased	102.4%
Car-Miles increased	38 %
Passengers Carried increased	30.6%
Passenger Revenue increased	12.7%
Rates of Ticket Fares decreased	16.6%
Trains late decreased	64.2%
Cars put out account late trains decreased	30 %

Approx. Operating Costs per Car-Mile	
Maintenance of Ways & Structures	3.5¢
Maintenance of Equipment	1.5¢
Power	3.4¢
Conducting Transportation	8.1¢
Traffic	0.5¢
General & Miscellaneous	3.6¢
Total	20.6¢

Almost two years ago the Kentucky Traction & Terminal Co., Lexington, placed in operation twelve 25,000-lb. interurban cars equipped with GE-264 Motors, CP-27 Compressor and K-35 Control.

These cars provided improved service and up to date have operated 1,500,000 car-miles, an increase of 38% over the mileage formerly operated.

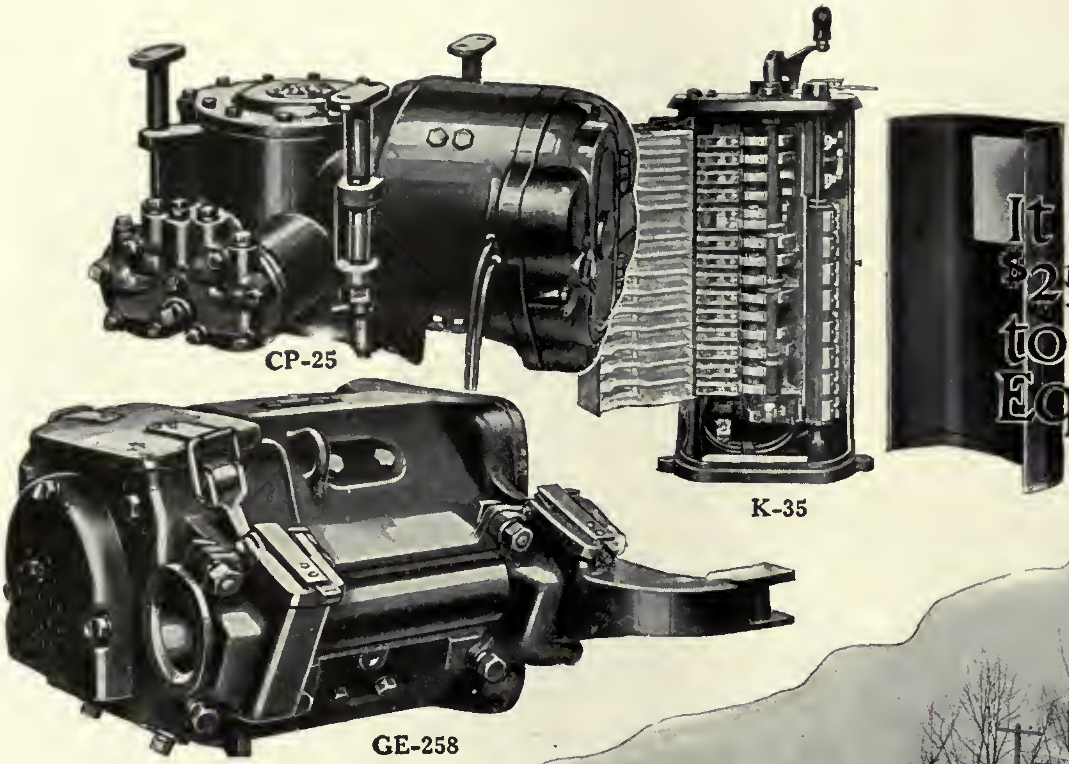
The improved service increased the passengers carried 30%. The new equipment reduced operating costs per car-mile 37%. The result is an increase of 102% in the net income.

General Electric Co.
Schenectady, N. Y.

GENERAL ELECTRIC

25-222

LIGHT



It has cost $29,000 less to maintain Equipment

Maintenance of Way and Structure reduced $17,400

$220,000 saved in 5½ years

The Results of Light Weight

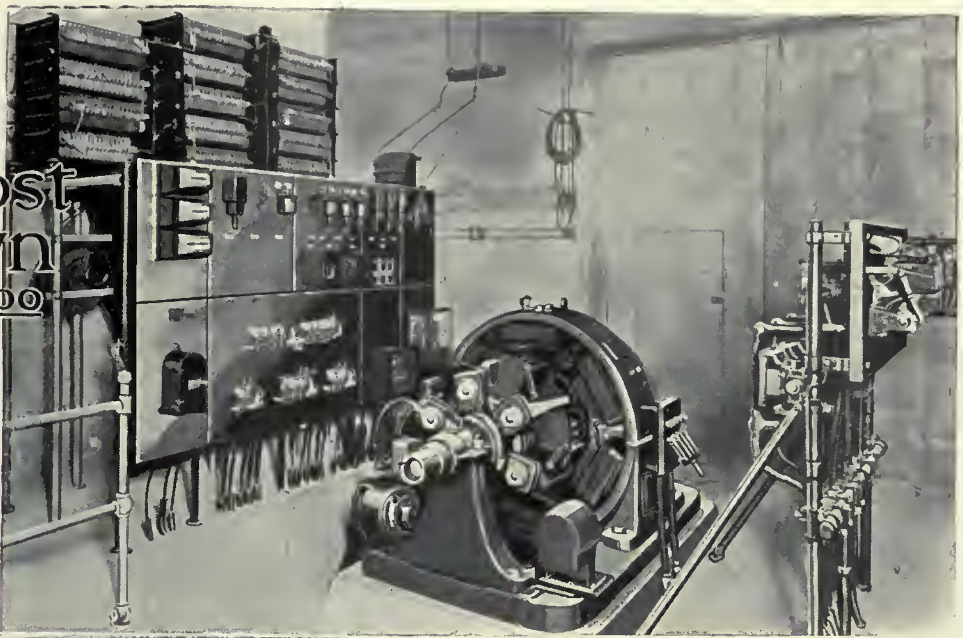
Comparative Operating Costs

	WITH FORMER EQUIPMENT		WITH LIGHT-WEIGHT CARS		SAVING
	Cents per car-mile	TOTAL	Cents per Car-mile	TOTAL	
Maintenance of Way and Structure	4.2	$121,800	3.6	$104,400	$ 17,400
Maintenance of Equipment	2.5	72,500	1.5	43,500	29,000
Power	6.9	200,100	2.2	63,800	136,300
Conducting Transportation	10.0	290,000	8.7	252,300	37,700
General and Miscellaneous	3.6	104,400	3.6	104,400	
TOTAL	27.2	$788,800	19.6	$568,400	$220,400

GENERAL

WEIGHT

Power cost cut down $136,300 00



Conducting transportation $37,700 Less

on the C.L.&A. $40,000 saved per year

Five and a half years ago the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad changed over its entire passenger equipment to light-weight cars and replaced its power plant with purchased power and two 200-kw. automatic substations to feed the 32.5 miles of line.

The net cost of this installation after deducting salvage received from the sale of old equipment was $60,000. The seven 13-ton 44-passenger cars began regular service on June 1, 1918. Up to August 1, 1923, they made 2,900,000 car-miles at the saving of $220,000, itemized on the opposite page.

This road was the pioneer in the adoption of lighter-weight as a means of reducing operating cost.

A partial list of nearly fifty properties on the following pages, representing every section of the country, gives some idea of the extensive use of light-weight equipment. It also testifies to the cooperation given by the General Electric Company in applying proper motive equipment to cars of lighter weight. All of these cars are GE-Equipped.

General Electric Co.
Schenectady, N. Y.

ELECTRIC

25-219

LIGHT

On other roads in the Middle West

All of the equipments listed on these pages have GE-264, GE-265 or GE-275 Motors and K-Control. More than 65% of them are equipped with G-E Air Brakes. The low maintenance costs on these equipments, as given on the preceding pages, should prompt you to investigate G-E Motors and G-E Control if you are considering the adoption of lighter-weight.

	Number of cars
Central Illinois Public Service Co.	2
Chicago, Aurora & Elgin R. R. Co.	7
Cincinnati, Georgetown & Portsmouth R. R. Co.	7
Cincinnati, Lawrenceburg & Aurora Electric St. R. R. Co.	7
Cincinnati, Milford & Blanchester Traction Co.	2
City Railway Co., Dayton, Ohio	15
Dayton, Springfield & Xenia Southern Ry. Co.	4
Detroit Street Ry.	350
Eastern Wisconsin Electric Co.	5
Fostoria & Fremont Ry. Co.	2
Indiana Service Corporation, Ft. Wayne	25
Indianapolis Columbus & Eastern	6
Inter-State Public Service Co., Indianapolis	5
Ironwood & Bessemer Ry. & Light Co.	7
Maumee Valley Railways & Light Co., Toledo	7
Northwestern Ohio Ry. & Power Co.	4
Pennsylvania-Ohio Power & Light Co.	12
Portsmouth Street R. R. & Light Co.	6
Toledo & Western R. R. Co.	3
Western Ohio Ry. Co.	8
Youngstown & Suburban Ry. Co.	2

—and in the West

Los Angeles Ry. Corporation	41
San Francisco-Oakland Terminal Ry.	55
Seattle Municipal Street Ry.	9

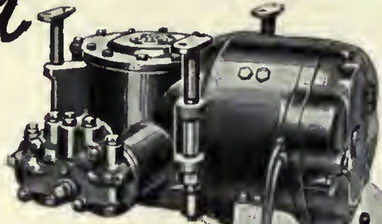
General Electric Co.
Schenectady, N. Y.

GENERAL

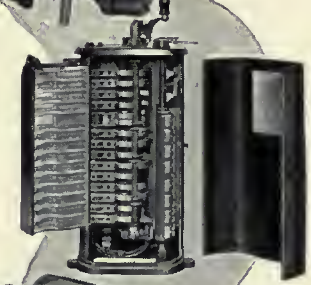
WEIGHT

-and in New England

	Number of cars
Androscoggin & Kennebec Ry. Co.	1
Bangor Ry. & Electric Co.	6
Boston Elevated Ry. Co.	130
Connecticut Co., New Haven	25
Cumberland County Power & Light Co.	12
Eastern Massachusetts Street Ry. Co.	40
New Haven & Shore Line Electric Ry.	5
United Electric Railways Co., Providence	150
—others in Pennsylvania	
Conestoga Traction Co.	5
Eastern Pennsylvania Railways Co.	2
Northampton Traction Co.	7
Philadelphia Rapid Transit Co.	520
Reading Transit & Light Co.	8
—and in the South	
Dallas Street Ry. Co.	30
Danville (Va.) Traction & Power Co.	8
Eastern Texas Electric Co.	7
Georgia Ry. & Power Co.	40
Kentucky Traction & Terminal Co., Lexington	14
Knoxville Power & Light Co.	7
Louisville Railway Co.	15
Memphis Street Railway	40
Northern Texas Traction Co.	10
Pittsburg County Ry. Co.	3
Union Traction Co., Nashville, Tenn.	6



CP-25



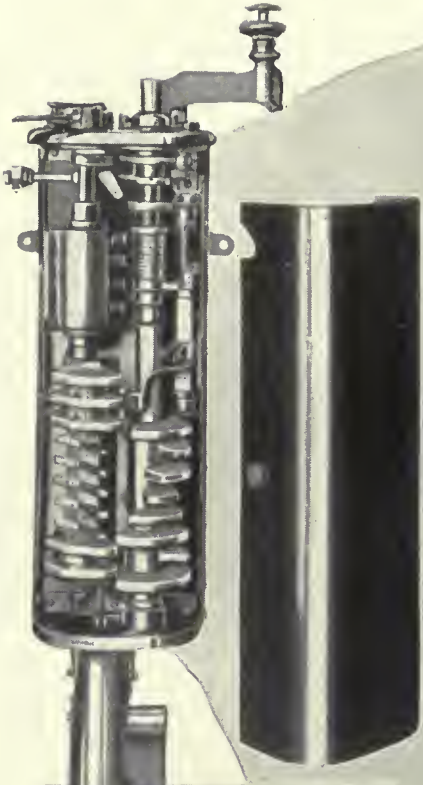
K-35

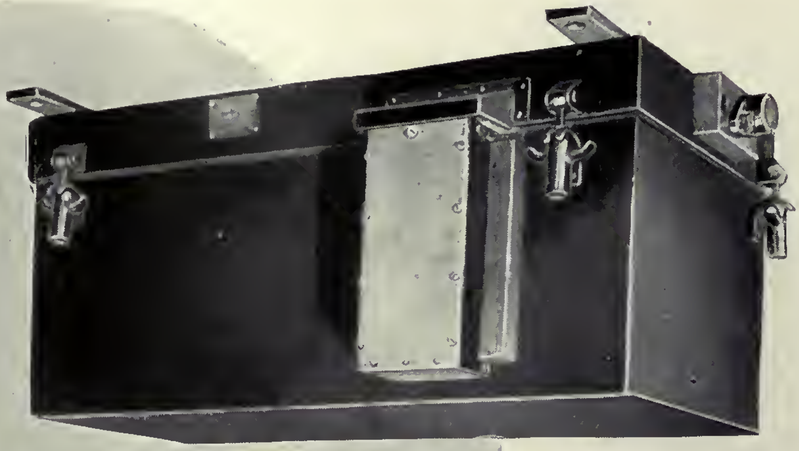
GE-264

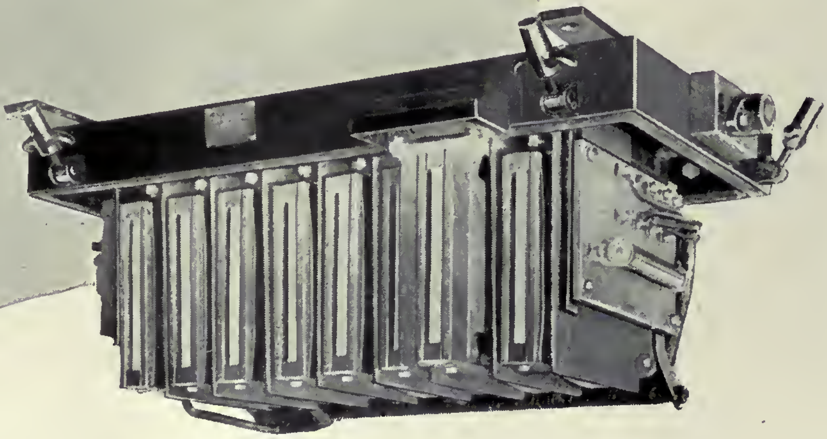
ELECTRIC

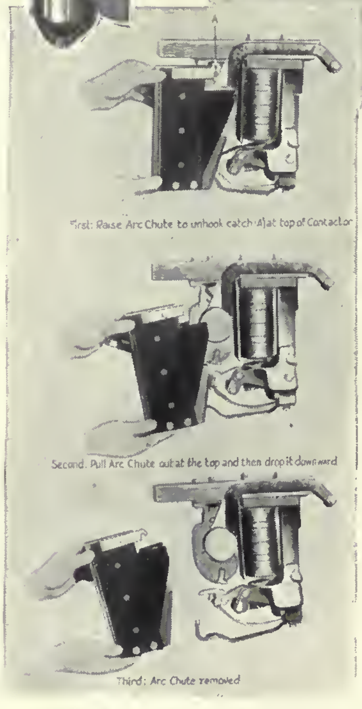
25-220

LIGHT WEIGHT









First: Raise Arc Chute to unhook catch (A) at top of Contactor

Second: Pull Arc Chute out at the top and then drop it downward

Third: Arc Chute removed

Showing the removal of arc chute without tools

Light-Weight "M" Control

The light-weight type "M" Control is of particular interest to operators who contemplate train operation of modern light-weight cars.

This Control incorporates all the desirable features which have made type "M" so successful, and in addition, has all the modern improvements, such as, auxiliary arcing horns, arc suppressor plates, and removable arc chutes.

The total weight of the complete equipment is 1400 lb.

On display in G-E Space No. 20.

General Electric Company
Schenectady, N. Y.

GENERAL ELECTRIC

25-223

New York, Saturday, September 29, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

Volume 62 HENRY W. BLAKE and HARRY L. BROWN, *Editors* *Number* 13

Inviting You to Get Aboard—the New Interurban Cars of the Northampton Transit Company, Easton, Pa.

The Broad Trend of Car Development

We Move Either Forward or Backward—We Must Progress

REAL progress comes when one sees beyond the restrictions of precedent. And it is this sort of progress that the industry is most earnestly in need of these days. Some small measure of this spirit has been in evidence during the past year and a half, for there has been an unusual degree of activity in connection with the development of the electric railway car. Out of this has come many new ideas, and there appears to be a number of distinct trends of development which it is worth while to assemble and study for the purpose of determining where we are headed. The more important of these, detailed in succeeding pages, are summarized here.

There is in evidence a distinct trend away from the single-truck, single-door safety car whose adoption has been so strongly urged as a standard. This trend has been first toward a double-door car of the single-truck type, and more recently and with greater rapidity toward the general use of a double-truck, double-door, one-man safety car. A still more recent though pronounced trend is toward a very broad use of a type of car larger than the one-man car but smaller than the common two-man car, which is usually termed the one-man two-man type. More cars of this design have been purchased during the first six months of this year than of all other types put together. It is simply a realization of the fact that the operation of cars with one man, which was so timidly entered into a few years back, has a very much broader application than was at first conceived, provided the design of the car is made suitable for the widened field. The adoption of this car goes a long way toward solving the problem from an economic standpoint of being able to supply an entirely satisfactory off-peak service while making it possible to handle the rush hour crowds on all but possibly the heaviest lines in most cities without excessive investment in cars suitable for rush period service only.

Originally it was considered that a one-man car was adapted only for the very lightest lines, but now with this later development the one-man idea may be spread, in fact, is being spread, to include lines where the loading runs quite heavy. The best part of this is that this is meeting with favor on the part of trainmen. They have even expressed their preference for one-man operation on lines that were considered by the management to be outside the range of one-man service.

Increasing street traffic is tending to bring increased use of train operation on the heaviest city lines. In this connection several notable installations have been made this year where the type of car used was of the one-man two-man class, but equipped with multiple-unit control so that two-car trains could be made up and operated with three men. This has been a development in the direction of providing a universal car.

NATURE OF THE DEVELOPMENTS IN CAR EQUIPMENT

These are the major aspects of recent car development. Paralleling them have come many improvements in equipment details. There has been an almost universal adoption of small diameter wheels in new cars for everything except the very heavy interurban service.

Marked improvements in car body construction have been introduced, including some most interesting applications of new materials.

Just as the heavy side sill used in wood frame cars was abandoned in favor of the plate side girder, this construction is in turn being considerably modified on a number of recent cars by the elimination of the side posts below the belt rail. These have been transformed into light sash guides only, with a self-supporting roof structure resting on rigid corner piers through which the roof load is transmitted almost directly to the bolsters.

The interior arrangements of cars have been given much thought looking toward schemes that would expedite the movement of passengers and speed up the service by reducing the standing time for passenger interchange.

As to motors, brakes, control and miscellaneous mechanical and electrical equipment, no fundamental changes have been made, but there has been considerable progress in the way of refinements both in design and construction, producing more reliable operation and reduced weight. As a matter of fact the major improvements in car equipment came some time back and really anticipated the more recent broad developments in car design. Just now the manufacturers seem to feel that there is not much further important development in sight, which perhaps indicates that somewhere near the ultimate goal has been reached and that future development must come through radical departure from the present accepted method of driving the electric car.

In connection with such auxiliary apparatus as the lighting, heating and ventilating equipment, the principal development seems to be of a nature recognizing the psychological factors involved in the problems of passenger comfort. While not much definite accomplishment can be recorded in summing up what has recently been done, there are within reach some very important developments both in the design and application of this type of equipment which should come into use in the near future.

MORE THOUGHT IS BEING GIVEN TO MERCHANDISING FEATURES

Along with all of these other developments has come a very definite attempt to provide comfort for the passenger and to make the car both attractive and pleasing in appearance. The element of passenger comfort as one of the controlling requirements in car design has come to be recognized to a degree never before attained but greatly to be desired, particularly now-a-days in view of the competition of other forms of transportation. The subjects of painting, of design to get stream line effects and to overcome stubby appearance in the smaller cars, and the use of plate glass and pleasing decoration with absence of mechanisms inside the car, are receiving new attention. Many of the pictures reproduced throughout the issue show this. We hear a great deal of the rubber urge, but much of what that means can be satisfied by a better appreciation of spring cushions, plus some further study of ways to reduce noise.

WHAT SHOULD BE THE AVERAGE LIFE OF A CAR

There is another idea in connection with the design of railway rolling stock which has been much discussed of late but out of which no very definite design principles have been crystallized. It has to do with the subject of what is the proper life for which to build railway cars.

The final answer to this question is simply a matter of economics. That life is most economical which at its end shows the greatest net earning for the car. In other words, a car should be disposed of just as soon as it can profitably be replaced, as shown by a comparison of the operating and maintenance costs and merchandising value of the old and the new. The trouble has been that railways have clung to the old equipment even twenty-five and thirty years when plain economics would have shown that it should long since have been replaced. The common plea is that money cannot be raised to buy new cars. It has been repeatedly demonstrated, however, that when the railway has the will to modernize, it is possible to finance new equipment on the basis of the savings in operating costs that can be shown.

The chief function of a railway company is to sell rides at a profit. Its purpose is accomplished only when it succeeds in rendering satisfaction to the public. It is only when the railway is furnishing a form of transportation superior to any other of equal cost, and showing a tendency to improve and progress as conditions change, that favorable public opinion and support may be expected. Blind following of precedent frequently leads into the toleration of a great many really obsolete practices. It is therefore very desirable that railway men compare their industry with the progress made in other lines of business, and try to withdraw themselves far enough from the immediate and detailed problems of the moment to get a perspective of their own tools as they appear to others. Having this viewpoint, there may come the necessary inspiration and ideas for new development.

New Data Show

Present Body Design Tendencies

Knowing What's Going On Is the First Step

Cars ordered during first half of 1923 indicate growing popularity of one-man two-man type for both city and interurban service. General features of current design shown by weighted averages. Arch roofs and "T"-posts universally used. Two-motor equipment and one-man two-man, center-exit arrangement in Philadelphia. Double-end pay-pass cars in Brooklyn another new departure. Flush platform construction favored. Ramps generally used. Analysis shows drop platform gives low steps

◆

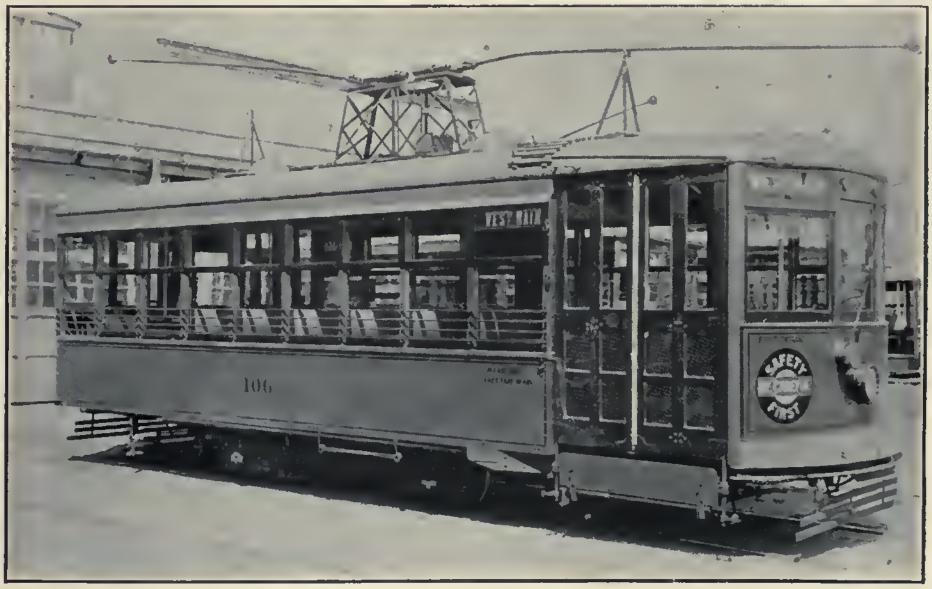
A STUDY of the types of cars recently built and of those now on order or in process of delivery indicates several distinct trends in the development of electric railway equipment, not only for city but also for interurban service. Some of the tendencies may be readily determined by an analysis of the data presented in the accompanying tabulations, which have been prepared to show in some detail the general characteristics from the standpoint of design of the cars ordered during the six-month period from Jan. 1 to June 30 of this year.

In order to facilitate comparison with similar data given in the annual statistical issues of ELECTRIC RAILWAY JOURNAL, the same arrangement has been followed in Table I, of dividing the various railway companies into districts and grouping them by states. Other tables have been prepared for particular types of cars in order to assemble the data for each type of car in such form that outstanding features of the design would be readily available for analysis.

The figures compiled in Table II show the total number of cars of various classifications for both city and interurban service ordered in the United States between Jan. 1 and June 30, 1923. These figures are given in the next to the last column. For the purpose of comparison the data for the entire year of 1922 is given in the last column.

TRENDS SHOWN BY STATISTICS

A number of extremely interesting phases of present tendencies are well illustrated by these data. Out of a total of 1,385 cars for city service ordered for the first half of 1923, 1,049, or 76 per cent, were double-truck one-man cars or of the one-man two-man type. During the same period a total of 157 single-truck safety cars were ordered, of which 147 have car bodies 28 ft. over all. The number of single-truck one-man cars ordered represents approximately 11 per cent of the total for the first half of the current year.



Madison Single-Truck Safety Cars Were Among the First to Be Built with Double Doors for Separate Entrance and Exit

A comparison of these figures with similar figures covering the cars built during the year of 1922 show some extremely interesting facts. The total number of double-truck one-man, or one-man two-man cars, ordered in 1922, amounted to 627 or 23½ per cent of the total number of 2,679 city cars built during that year.

Making a similar comparison of single-truck one-man cars, the table shows a total of 823 cars of this type ordered, which represents slightly more than 30 per cent of the total ordered for the year. Thus, while the number of single-truck one-man cars decreased from 30 per cent of the total in 1922 to 11 per cent of the total for the first six months of 1923, the number of double-truck one-man or one-man two-man cars which were ordered during the corresponding period increased from approximately 23 per cent in 1922 to approximately 76 per cent in 1923.

This outstanding tendency toward the introduction of one-man or one-man two-man double-truck cars has been further analyzed in Table III

Table I—Data on Passenger Cars Ordered During First Six Months of 1923—(New England District)

Railway	No. of Cars Ordered	Type	Single or Double End	One or Two Man	End Doors or Both Center and End Doors	Length Over All, Ft. In.	Width Over All, Ft. In.	Seating Capacity		Total Light Weight, Lb.	Light Weight of Car Less Trucks & Motors, Lb.	Thickness of Side Girder Steel	Car Width Inside Lining, Ft. In.	Dimension, Lining Over Seat Aisle Plate, In.	Clear Width of Aisle, In.	Cross Seat Spacing, In.	Side Post Spacing, In.	Type of Side Posts	Type of Bolster	Type of Roof	Type of Truck	Number of Motors	Hp. per Motor	Diameter Wheels, In.	End Sill Step	Ramps From Bolster to Platform Knee, In.	Step Heights, In.
								Body	Platforms and Wells																		
CONNECTICUT																											
Connecticut Co.	50	DT-C	D	1-2	End	44—0	8— 4½	44	0	30,000	15,800	3/32	8— 1½	34¼	29	28½	28½	T	BU	Arch	OBC-30-66	4	....	26	No	4⅜	15-14
New Haven & Shore Line Ry.	5	LI	D	1-2	End	40—3	8— 3	22	4	29,000	15,000	14	7—10	35	24	31	31	T	BU	Arch	B-77-E1	4	25	26	No	1¼	15½-15¼
MAINE																											
Androscoggin & Kennebec Ry.	5	DT-C	D	1-2	End	40—3	8— 3	48	4	29,350	15,780	14	7—10	34	26	28½	28½	T	BU	Arch	B-77-E1	4	25	26	No	1¾	15½-15¼
Cumberland County Power & Light Co.	6	LI	D	1-2	End	40—3	8— 3	48	2	32,500	15,800	14	7—10	35	24	28½	28½	T	BU	Arch	B-77-E1	4	40	26	No	1¾	15½-15¼
MASSACHUSETTS																											
Boston Elevated Ry.	50	DT-C	D	1-2	End	45—0	8— 6⅛	48	0	30,860	18,360	14	8— 2¼	35⅛	28¼	28½	28½	T	BU	Arch	S-C 35-P	4	25	26	No	3	15-14
	30	DT-C	D	1-2	End	45—0	8— 5½	48	0	30,640	17,550	14	8— 2½	35⅛	28¼	28½	28½	T	BU	Arch	S-C 35-P	4	25	26	No	3	15-14
Millford & Uxbridge St. Ry.	6	LI	D	1-2	End	40—3	8— 3	44	4	29,000	15,500	14	7—10	35	24	31	31	T	BU	Arch	B-77-E1	4	25	26	No	None	15-14-5
Springfield St. Ry.	10	DT-C	D	2	End	48—4	8— 5	56	...	....	....	3/32	8— 1	L	....	....	....	T	BU	Arch	Std.	4	50	31	No	None	16-12-8½
Union Street Ry.	6	DT-C	D	1-2	End	44—0	8— 4½	44	0	30,000	15,800	3/32	8— 1½	33¾	26	28½	28½	T	BU	Arch	OBC-30-66	4	25	27	No	4⅜	15-14½
North of the Ohio and East of the Mississippi River																											
ILLINOIS																											
Bloomington & Normal Ry. & Lt. Co.	10	ST-C	D	1	End	28—0½	8— 0	28	4	16,000	9,500	16	7— 6¼	34⅛	22	28½	28½	T	None	Arch	B-79E	2	25	26	No	None	16⅞-12 1/16
Chicago Elevated Rys.	5	El-M	D	Tn	End	48—0	8—10½	52	0	75,000	42,000	14	....	37	21¾	32	31⅞	Sh. St.	BU	Arch	Bal.	2	170	30	No	None	46½ to platform
Chicago, North Shore & Milwaukee R.R.	10	HI	D	Tn	End	55—3¼	9— 0	54	0	102,200	56,200	12	....	38½	20 11/16	35	35	T	BU	Arch	Bal.	4	140	36	No	None	16 3/16-11 3/16-11 3/16-11 3/16
	2	HI	Tr	Tn	End	55—3¼	9— 0	31	0	80,070	50,070	12	....	....	Ch	....	70¼	Sh. St.	BU	Arch	Bal.	0	0	36	No	None	16 3/16-11 3/16-11 3/16-11 3/16
	1	HI	D	Tn	End	55—3¼	9— 0	24	0	102,340	56,340	12	....	....	Ch	....	35	T	BU	Arch	Bal.	4	140	36	No	None	16-12-12-12
East St. Louis & Suburban Ry.	1	LI	D	2	C	53—8	8— 8	48	10	47,000	29,800	3/16	8— 1¾	34⅛	23	29½	29½	T	BU	Arch	St.L-MT	4	50	34	No	None	15¾-11-11
INDIANA																											
Beech Grove Traction Co.	1	ST-C	S	1	End	28—0½	8— 0	28	7	16,500	9,720	16	....	35	22	28½	28½	Wood	PS	Arch	C-139-C	2	25	26	No	2⅛	15-12⅞
Indianapolis & Cincinnati Tr. Co.	12	HI	S	2	End	60—0	8—11	54	0	75,000	38,000	12	....	41	21	34	34	T	BU	M	Bal.	4	100	37	No	None	15½-12-12-12
MICHIGAN																											
Muskegon Traction & Lighting Co.	5	DT-C	D	1-2	End	44—7	8— 4⅞	44	0	32,000	19,500	...	....	....	....	28½	28½	T	BU	Arch	St.L-AB	4	25	26	No	2	16 1/16-13
NEW JERSEY																											
Cumberland Traction Co.	5	ST-C	D	1	End	28—0½	7—10¾	28	5	17,015	10,315	16	7— 6⅜	34⅛	27⅛	28½	28½	T	None	.....	B-79-E	2	25	26	No	None	14¼-14 3/16
	1	DT-C	D	1	End	40—3	8— 2¾	48	0	30,160	16,460	3/32	7—10½	34⅛	26¼	28½	28½	T	BU	Arch	B-77-E1	4	25	26	Yes	None	15½-14½-2¼
West Jersey & Seashore	2	DT-C	D	2	End	47—8	8— 7	52	0	38,700	21,700	12	8— 1½	36	25½	28	29½	Sh. St.	CS	Arch	B-77-E1	4	40	26	Yes	None	14-13 15/16-3 13/16
NEW YORK																											
Brooklyn City R. R.	100	DT-C	D	1-2	C&E	44—2	8— 1½	41	8	37,500	20,860	3/32	7—11¼	34	25¾	28½	28½	T	BU	Arch	B-77-E1	4	35	26	Yes	......	15-11-6, 15-13
	100	DT-C	D	1-2	C&E	44—2	8— 1½	41	8	38,000	21,360	3/32	7—11¼	34	25¾	28½	28½	T	BU	Arch	B-77-E1	4	35	26	Yes	......	15-11-6, 15-13
Brooklyn Manhattan Transit Corp.	50	DT-RT	Tr	....	Side	67—0	9-10 15/16	97	0	77,000	51,500	3/32	9— 1⅜	....	....	....	....	Sh. St.	BU	M	BU	0	....	34½	No	......	46½ to platform
Fonda, Johnstown & Gloversville R.R.	2	DT-C	D	2	End	46—0	8— 7	52	0	......	......	3/32	8— 2	36	26	29½	29½	T	BU	Arch	Taylor	4	....	...	Yes	......	16-14-11
	1	HI	D	2	End	52—9	8— 9	60	0	......	......	3/32	8— 4	37	26	31	31	T	BU	Arch	Taylor	4	....	...	Yes	......	17½-17½-13
OHIO																											
Ohio Public Service Co.	2	ST-C	D	1	End	28—0½	7—10¾	28	5	15,960	9,560	16	7— 6⅜	34⅛	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¼-14 3/16
Pennsylvania-Ohio Power & Light Co.	5	ST-C	D	1	End	28—0½	7—10¾	26	4	16,500	9,820	16	7— 6⅜	34⅛	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Cincinnati, Georgetown & Portsmouth Ry.	2	LI	S	1	End	39—8	8— 6⅜	40	7	25,400	13,900	16	....	37	24	33	33	Wood	BU	Arch	CinArchBar	4	25	26	No	2¼	16-14
City Ry.	10	DT-C	S	1	End	42—6	8— 2	46	5	25,897	14,197	16	....	35	24½	30	30	Wood	BU	Arch	CinArchBar	4	25	26	No	2¼	16-14
PENNSYLVANIA																											
Citizens Traction Cos.	5	ST-C	D	1	End	28—0½	7—10¾	28	5	16,640	10,020	16	7— 6⅜	34⅛	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Conestoga Traction Co.	10	ST-C	D	1	End	30—1	8— 2¼	30	0	17,790	11,235	16	7—10⅜	34⅛	26⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¼-14 3/16
Eastern Pennsylvania Power & Ry. Co.	2	DT-C	D	2	End	45—0	8— 6⅛	48	0	35,700	19,500	14	8— 2¼	36	26¼	28½	29½	T	BU	Arch	B-77-E-1	4	25	26	Yes	None	15-14-3
Lackawanna & Wyoming Valley R. R.	4	HI	D	Tn	End	60—0	9— 2	72	0	70,000	35,000	⅛	8— 9	40½	24	28½	28½	T	BU	M	Bal.	2	....	36 33	No	None	15-11½, 11¾-11½
Northampton Transit Co.	2	LI	D	1-2	End	44—8	8— 6⅜	48	0	30,600	16,328	16	8— 1½	37	23½	30	30	Wood	BU	Arch	Cin AB	4	35	26	No	2¼	16-14
Philadelphia Rapid Transit Co.	385	DT-C	S	1-2	C&E	45—6	8— 1½	54	0	35,820	19,940	14	7— 9¼	34	25¼	29	29	T	CS	Arch	B-39-E-2	2	60	22 28	Yes	None	13 15/16-13-6 1/16
	135	DT-C	D	1-2	End	45—6	8— 1½	48	0	37,720	21,840	14	7— 9¼	34	43⅜	29	29	T	CS	Arch	B-39-E-2	2	60	22 28	Yes	None	13 15/16-13-6 1/16
Pittsburg Rys.	75	DT-C	S	2	C&E	45—0	7—10½	65	4	....	....	...	....	....	22¼	30	30	Box	BU	M	AB	4	37	26	No	......	15-10½
Slate Belt Transit Co.	2	LI	D	2	End	47—0	8— 4¼	52	0	38,570	22,740	3/32	7—11½	31¼	23¼	32	32	T	CS	Arch	27 MCB2x	4	50	33	Yes	None	16 5/16-13 3/16-10 15/16

West Penn. Rys.	17	LI	D	1-2	End	42—2	8—6½	44	0	30,090	16,590	16	8—1½	36	25½	30	30	Wood	BU	Arch	Std.	4	25	26	No	2¼	16-14
Wilkesbarre Ry.	10	DT-C	D	2	End	45—0	8—6⅝	48	0	37,700	19,500	14	8—2¼	36	26¼	28½	29½	T	BU	Arch	B-77-E	4	40	26	Yes	None	15-14-3
York Rys.	3	ST-C	D	2	End	34-11½	8—8¼	36	2	21,956	12,916	16	8—4½	37	26½	29	29	T	None	Arch	B-79-E-2	2	35	26	Yes	None	14-13-3¼
WISCONSIN																											
Eastern Wisconsin Electric Co.	5	LI	D	1	End	43—0	8—9½	44	0	36,760	......	...	......	....	....	....	30	T	BU	Arch	Com. Pd.	4	25	26	No	3	16⅝-12⅞

South of the Ohio and East of the Mississippi River

ALABAMA																											
Birmingham Ry., Light & Power Co.	20	DT-C	S	2	C&E	49—5	8—5	62	0	34,000	18,884	12	......	36	25	29	29	Wood	Box	Arch	Brill	4	35	26	No	1 13/16	13-10-7
FLORIDA																											
Tampa Electric Co.	8	ST-C	D	1	End	28—0½	8—0	28	4	15,500	8,930	16	7—8	35	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16⅞-12 1/16
GEORGIA																											
Savannah Electric Co.	8	ST-C	D	1	End	28—0½	8—0	28	4	15,500	9,200	16	7—7⅞	34 15/16	22	28½	28½	T	None	Arch	B-79-E1	2	25	24	No	None	15⅞-12 1/16
KENTUCKY																											
Kentucky Traction & Terminal Co.	27	ST-C	S	1	End	26—2	8—2	26	2	16,600	9,820	16	......	36	23	30	30	Wood	P. S.	Arch	Cin12585-C	2	25	26	No	None	15-13
	2	LI	S	1	End	40—3	8—6½	37	7	26,700	15,100	16	......	38	22	33	33	Wood	Box	Arch	CinArchBar	4	25	26	No	2¼	16-14
NORTH CAROLINA																											
Piedmont & Northern Ry.	2	ST-C	D	1	End	28—0½	7—10¾	28	5	20,500	10,000	16	7—6⅜	34⅛	22⅛	28½	28½	T	None	Arch	79-E-2X	2	50	30	No	None	16 9/16-15 11/16
SOUTH CAROLINA																											
Columbia Ry., Gas & Electric Co.	6	ST-C	D	1	End	28—0½	7—10¾	28	5	17,120	10;395	16	7—6⅜	34⅛	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
TENNESSEE																											
Jackson Ry. & Light Co.	3	ST-C	D	1	End	28—0½	8—0	28	4	16,000	9,500	16	7—7⅞	34 15/16	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16⅞-12 1/16
Memphis Street Ry.	40	DT-C	D	1-2	End	44—10	8—2⅞	48	0	33,400	20,900	...	......	....	....	28½	28½	T	BU	Arch	St.L.-AB	4	25	26	No	2	16 1/16-13
VIRGINIA																											
Radford Water Power Co.	1	ST-C	D	1	End	28—0½	7—10¾	28	5	16,740	10,015	16	7—6⅜	34⅛	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-14 3/16
Virginia Ry. & Power Co.	20	ST-C	D	1	End	28—0½	7—10¾	27	2	16,840	10,265	16	7—6¾	34⅛	22⅛	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	14¾-15⅛
WEST VIRGINIA																											
Monongahela Power & Ry. Co.	2	HI	DE	2	C	58—0	8—10½	70	0	53,120	26,540	12	......	27	26⅜	29	30	Wood	Box	Arch	AB	4	50	33	Well at Center		17¾-14-12
Wheeling Traction Co.	2	HI	DE	2	C	58—0	8—10½	70	0	53,120	26,540	12	......	37	26⅜	29	30	Wood	Box	Arch	AB	4	50	33	Well at Center		17¾-14-12

West of the Mississippi River

CALIFORNIA																											
San Diego Elec. Co.	50	DT-C	D	1-2	End	47—5	8—6½	48	8	38,000	22,200	12	7—8½	34	24½	31	31	T	BU	Arch	B-77-E	4	40	26	No	3	16-14
San Francisco-Oakland Terminal Ry.	55	DT-C	D	1-2	End	44—10	9—1½	48	0	36,000	19,700	12	8—4½	35	30½	29½	29½	T	BU	Arch	B-77-E	4	40	24	No	2	14-13
COLORADO																											
Southern Colorado Power Co.	6	ST-C	D	1	End	28—0½	8—0	28	2	16,000	9,500	16	7—7⅞	34⅛	22	28½	28½	T	None	Arch	B-79-E1	2	25	26	No	None	16⅞-12 1/16
Western Light & Power Co.	1	ST-C	D	1	End	28—0½	8—0	28	4	16,000	9,430	16	7—7⅞	34⅛	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16⅞-12 1/16
IOWA																											
Peoples Gas & Electric Co.	4	ST-C	D	1	End	28—0½	8—0	28	4	16,000	9,430	16	7—6¼	34⅛	22	28½	28½	T	None	Arch	B-79-E1	2	25	26	No	None	16⅞-12 1/16
KANSAS																											
Topeka Ry.	10	ST-C	S	1	End	28—0½	8—0	29	5	15,500	9,000	16	7—6¼	34⅛	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16⅞-12 1/16
MISSOURI																											
St. Joseph Ry., Light & Power Co.	12	ST-C	S	1	End	28—0½	8—0	27	9	15,500	9,000	16	7—6¼	34⅛	22	28½	28½	T	BU	Arch	B-79-E	2	25	26	No	None	16⅞-12 1/16
NORTH DAKOTA																											
Northern States Power Co.	1	ST-C	D	1	End	28—0½	8—0	28	2	16,000	9,500	16	7—6¼	34⅛	22	28½	28½	T	None	Arch	B-79-E	2	25	26	No	None	16⅞-12 1/16
TEXAS																											
Abilene Traction Co.	1	ST-C	D	1	End	28—0½	8—0	28	4	16,000	9,430	16	7—7⅛	34 5/16	22	28½	28½	T	None	Arch	B-79-E1	2	25	26	No	None	16⅞-12 1/16
Eastern Texas Electric Co.	7	DT-C	D	1	.....	40—1	8—5	44	4	28,000	15,460	3/32	8—2 5/16	35 5/16	28	28½	28½	T	......	Arch	B-77-E	4	25	26	No	2	16-13
Galveston-Houston Electric Co.	8	ST-C	D	1	End	28—0½	8—0	28	4	15,500	9,200	16	7—7⅛	34⅞	22	28½	28½	T	None	Arch	B-79-E1	2	25	24	No	None	15⅞-12 1/16
Houston Electric Co.	10	DT-C	D	1	End	40—1	8—5	...	...	28,000	......	3/32	8—2 5/16	35 5/16	28	28½	28½	T	BU	Arch	B-77-E	4	25	26	No	2	16-13
Northern Texas Traction Co.	1	ST-C	D	1	End	28—0½	8—0	28	4	15,000	9,400	16	7—7⅛	34⅞	22	28½	28½	T	None	Arch	B-78-M1	2	25	24	No	None	15⅞—
Northern Texas Traction Co.	10	DT-C	D	1	End	40—1	8—5	44	4	28,000	15,460	3/32	8—2 5/16	35 5/16	28	28½	28½	T	BU	Arch	B-77-E	4	25	26	No	2	16-13

ABBREVIATIONS USED IN TABLES

AB—Arch bar
BU—Built up
C—Center entrance
C&E—Center and end
Ch.—Chairs used
CS—Cast steel
D—Double end

DT-C—Double truck, city service
DT-RT—Double truck, rapid transit service
El-M—Elevated motor cars
HI—Heavy interurban
L—Longitudinal seats
LI—Light interurban
M—Monitor roof

PS—Pressed steel
S—Single end
Sh. St.—Sheet steel
ST-C—Single truck, city service
T—"T" section
Tn—Train operation
Tr—Trailer

to show the more general features of design which have been incorporated in the cars ordered by various properties.

Houston Electric Company's Double-Truck Safety Cars Represent the "Elongated" Birney Design with Single Door

One-Man Two-Man Cars in Milwaukee Have Flush Platforms and Arrangement So that a Street Collector Can Open Rear Doors from the Outside

There were a total of 1,011 cars of the one-man two-man type ordered for city service during the first half of 1923. The properties ordering these cars are shown in the first column of Table III. The headings in the remaining columns are self-explanatory. In order to give a comparison on the same basis, the seating capacity is divided into two parts, one column including seats within the body only, and the other column giving the number of platform seats provided. To obtain a comparison of the weight of car bodies without trucks and motor equipment, a column covering this item is provided.

The practice in regard to platform and step construction is well illustrated by the last four columns, indicating level or drop platform construction, ramps and step heights. In the column which is headed, "Ramp from Floor at Body Bolster to Floor at Platform Side Knee," the total ramp included between these two points is given. In some cases, this ramp is made up of a section from the bolster to the end sill in the body floor and an additional ramp on the platform from the center line to the side knee.

In the next to the last column, the step heights from rail to platform floor at the side knee are given and also the step from platform to body floor at the end sill, where drop platform construction is used. In this column the first figure indicates height from rail to step and the second figure the height from step to platform floor. Where three figures are given, the last indicates the height of the end sill step. On the last line of Table III the weighted averages for the figures given in the various columns have been worked out to show the average of practice as reflected by the cars ordered this year. In each case these weighted averages are made up by multiplying the individual figures by the number of cars ordered and dividing by the total number of cars of this type.

Several outstanding tendencies are at once apparent from an examination of the data in this table. It may be noted that in every case these new cars are of the arch-roof type and are constructed with T-posts. It is also interesting to note that all of the cars with the exception of one group of 385, ordered by the Philadelphia Rapid Transit Company, are of the double-end type. The end vestibule type of construction is used on all cars with the exception of the group of 385 cars just mentioned and a group of 200 cars ordered by the Brooklyn City Railroad.

This latter group represents an extremely interesting departure, in that the cars are of the front-entrance, center-exit type, but are double-end in design. This is accomplished by providing cross-seats in a portion of both sections of the car instead of using longitudinal seats entirely in one half, as is usually done in the front-entrance, center-exit type. The lengths vary from a minimum of 40 ft. 3 in. for the five cars built for the Androscoggin & Kennebec Railway to a maximum of 47 ft. 5 in. for the fifty cars built for the San Diego Electric Company. The weighted average length for all cars ordered is 45 ft. 1 in.

The widths, which are of course largely fixed by the clearance condi-

TABLE II—RECAPITULATION BY DISTRICTS OF CARS ORDERED DURING FIRST SIX MONTHS OF 1923

Type of Cars	New England District.	North of Ohio River and East of the Mississippi River.	South of Ohio River and East of the Mississippi River.	West of the Mississippi River.	Dominion of Canada	Total U. S. for 1st 6 months 1923.	Total U. S. for 1922
City Service							
Number of one-man cars (S.T. 28 ft. body)	...	28	75	44	2	147	752
Number of one-man cars (S. T. other than 28 ft. body)	...	10	...	...	10	10	71
Number of D.T. one-man cars	141	11	...	27	...	38	156
Number of one-man two-man cars	10	725	40	105	100	1,011	471
Number of two-man motor cars	...	94	20	...	62	124	864
Number of trailers	...	...	...	...	165	.....	50
Number of rapid-transit motor cars	...	5	...	...	...	5	315
Number of rapid-transit trailers	...	50	...	...	...	50	....
Totals	151	923	135	176	339	1,385	2,679
Interurban Service							
Light weight one-man cars	...	7	2	...	...	9	40
Light weight one-man two-man cars	17	19	...	...	...	36	5
Two-man cars	...	16	4	...	2	20	52
Heavy motor-cars for train service	...	15	...	...	...	15	70
Trailers for train service	...	2	...	...	2	2	16
Totals	17	59	6	...	4	82	183

Table III—Double-Truck, One-Man Two-Man Cars for City Service

Railway	Number of Cars Ordered	Single or Double End	End Doors or Both Center and End Doors	Length Over All		Width Over All		Seating Capacity		Total Light Weight, Lb.	Light Weight of Car, Less Trucks and Motors, Lb.	Thickness of Side Girder Steel	Car Width Inside Lining		Length Lining Over Seat Aisle Plate, In.	Clear Width of Aisle, In.	Cross Seat Spacing, In.	Side Post Spacing, In.	Type of Side Posts	Type of Bolster	Type of Roof	Number of Motors	Hp. per Motor	Total Hp. per Ton, Light Weight per Ft., Length of Car	Diameter Wheels, In.	End Sill Step	Ramp from Floor at Body Bolster to Floor at Platform Side Knee, In.	Step Heights, In.	Height from Rail to Platform Floor at Side Knee per In. of Wheel Diameter
				Ft.	In.	Ft.	In.	Body	Platforms & Well				Ft.	In.															
Androscoggin & Kennebec Ry.	5	D	End	40	3	8	3	48	4	29,350	15,780	14	7	10	34	26	28½	28½	T	BU	Arch	4	25	0.17	26	No	1¾	15½-15¼	1.18
Connecticut Co.	50	D	End	44	0	8	4½	44	0	30,000	15,800	3/32	8	1½	34¼	29	28½	28½	T	BU	Arch	4	25	0.15	26	No	4¾	15-14	1.12
Union Street Ry.	6	D	End	44	0	8	4½	44	0	30,000	15,800	3/32	8	1½	33½	26	28½	28½	T	BU	Arch	4	25	0.15	27	No	4¾	15-14½	1.09
Boston Elevated Ry.	50	D	End	45	0	8	6⅛	48	0	30,860	18,360	14	8	2½	35¼	28½	28½	28½	T	BU	Arch	4	25	0.14	26	No	3	15-14	1.12
	30	D	End	45	0	8	5½	48	0	30,640	17,550	14	8	2½	35⅛	28½	28½	28½	T	BU	Arch	4	25	0.14	26	No	3	15-14	1.12
Philadelphia Rapid Transit Co.	385	S	C&E	45	6	8	1½	54	0	35,820	19,240	14	7	9¼	34	25½	29	29	T	CS	Arch	2	60	0.14	22 †28	Yes	0	13 13/16-13-6 1/16 15-10-10	0.96
	135	D	End	45	6	8	1½	48	0	37,720	21,840	14	7	9¼	34	43⅞	29	29	T	CS	Arch	2	60	0.14	22 †28	Yes	0	13 13/16-13-6 1/16	0.96
San Francisco & Oakland Terminal Ry.	55	D	End	44	10	9	1½	48	0	36,000	19,700	12	8	4½	35	30½	29½	29½	T	BU	Arch	4	40	0.20	24	No	2	14-13	1.13
Brooklyn City R. R.	200	D	C&E	44	2	8	1½	41	8	37,500	20,860	3/32	7	11¼	34	25½	28½	28½	T	BU	Arch	4	35	0.17	26	Yes	0	15-11-6 15	1.00
San Diego Electric Co.	50	D	End	47	5	8	6½	48	*8 6	38,000	22,200	12	7	8½	34	24½	31	31	T	BU	Arch	4	40	0.17	26	No	3	16-14	1.15
Memphis Street Ry.	40	D	End	44	10	8	2⅞	48	0	33,400	20,900	....	....	....	....	....	28½	28½	T	BU	Arch	4	25	0.14	26	No	2	16 1/16-13	1.11
Muskegon Traction & Lighting Co.	5	D	End	44	7	8	4⅞	44	0	32.000	19,500	...	....	....	....	....	28½	28½	T	BU	Arch	4	25	0.14	26	No	2	16 1/16-13	1.11
Weighted Average	....	...	.....	45	1	8	3	48	...	35,754	19,903	....	7	11½	34	26½	....	....	...	....	....	...	....	0.151	....	....	2.9	14.3	1.125 0.971

Table IV—Double-Truck, One-Man or One-Man Two-Man Cars for Interurban Service

Railway	Number of Cars Ordered	One-Man or Two-Man	Single or Double End	End Doors or Both Center and End Doors	Length Over All		Width Over All		Seating Capacity		Total Light Weight, Lb.	Light Weight of Car Less Trucks and Motors, Lb.	Gage Thickness of Side Girder Steel	Car Width Inside Lining		Dimension-Lining Over Seat Aisle Plate, In.	Clear Width of Aisle, In.	Cross Seat Spacing, In.	Side Post Spacing, In.	Type of Side Posts	Type of Bolster	Type of Roof	Number of Motors	Hp. per Motor	Total Hp. per Ton Light Weight per Ft. Length of Car	Diameter of Wheels, In.	End Sill Step	Ramp from Floor at Body Bolster to Floor at Platform Side Knee, In.	Step Heights, In.	Height from Rail to Platform Floor at Side Knee per In. of Wheel Diameter
					Ft.	In.	Ft.	In.	Body	Platforms & Well				Ft.	In.															
Millford & Uxbridge St. Ry.	6	1-2	D	End	40	3	8	3	44	4	29,000	15 500	14	7	10	35	24	31	31	T	BU	Arch	4	25	0.17	26	No	None	15-14⅞-5	1.33
New Haven & Shore Line Ry.	5	1-2	D	End	40	3	8	3	22	4	29,000	15 500	14	7	10	35	24	31	31	T	BU	Arch	4	25	0.17	26	No	1¾	15½-15¼	1.18
Cumberland County Power & Light Co.	6	1-2	D	End	40	3	8	3	48	2	32,500	15 800	14	7	10	35	24	28½	28½	T	BU	Arch	4	40	0.24	26	No	1¾	15½-15¼	1.18
Northampton Transit Co.	2	1-2	D	End	44	8	8	6⅜	48	0	30,600	16,328	16	8	1½	37	23½	30	30	Short Wood	Box	Arch	4	35	0.24	26	No	2¼	16-14	1.15
West Penn Ry.	17	1-2	D	End	42	2	8	6½	44	0	30,090	16,590	16	8	1½	36	25½	30	30	Short Wood	Box	Arch	4	25	0.16	26	No	2¼	16-14	1.15
Eastern Wis. Elec. Co.	5	1	D	End	43	0	8	9½	44	0	36,760	.....	....	....	....	....	....	....	30	T	BU	Arch	4	25	0.13	26	No	3	16½-12⅞	1.13
Cincinnati, Georgetown & Portsmouth	2	1	S	End	39	8	8	6⅜	40	7	25,400	13,900	16	....	....	37	24	33	33	Short Wood	BU	Arch	4	25	0.20	26	No	2¼	16-14	1.15
Kentucky Traction & Terminal	2	1	S	End	40	3	8	6½	37	7	26.700	15,100	16	....	....	38	22	33	33	Short Wood	BU	Arch	4	25	0.19	26	No	2¼	16-14	1.15
Weighted Average	....	....	....	.....	41	6	8	5½	44	...	30,550	15,950	....	8	0	36	24½	....	....	....	....	....	....	....	0.176	....	....	2.2	15 11/16	1.18

* Seats eight when operated by one man. † Maximum-traction trucks.

tions existing in the several localities, vary from a minimum of 8 ft. 1½ in. to a maximum of 9 ft. 1½ in. This latter dimension applies to the fifty-five cars of the San Francisco-Oakland Terminal Railway. The weighted average width for all cars is 8 ft. 3 in. The maximum body seating capacity shown is fifty-four, this being for the 385-car group ordered by the Philadelphia Rapid Transit Company. The weighted average for all 1923 cars is forty-eight passengers in the body.

Double-Truck One-Man Cars of Chicago Surface Lines Are Designed with Drop Platforms and Are Equipped with Two 60-Hp. Motors on Maximum Traction Trucks

San Francisco-Oakland Terminal Railway's New One-Man Two-Man Cars Are Also Equipped with Multiple-Unit Control for Train Operation

New Pay-as-You-Pass Cars for Philadelphia Are Arranged for One-Man Two-Man Operation

The total light weight varies from 29,350 lb. as a minimum to 38,000 lb. as a maximum and the weighted average is 35,754 lb. The weighted average light weight of the car body only is 19,903 lb. The material for side girder sheet tells a rather interesting story in that No. 16 gage material is not used for double-truck city service construction on cars ordered this year. The minimum size used as shown in the tabulation is $\frac{3}{32}$ in. and the maximum is No. 12 gage.

The average width of the cars inside, between side wall linings, is 7 ft. 11½ in. There seems to be a tendency to decrease slightly the width of cross-seats and to make this dimension more nearly 34 in. than the 36 in. which for a long time was considered good practice. With seat width maintained almost uniform, the aisle width of course varies with the maximum dimension which can be used for the car, and the table shows the use of aisles varying from 24½ to 30½ in. This latter figure, however, is based on a car width of 9 ft. 1½ in. and does not represent the clearance conditions which can be accommodated in the average city. In the 135 double-end cars purchased by the Philadelphia Rapid Transit Company, a combination of staggered cross and longitudinal seats is used, and the resulting aisle width of 43⅜ in. is not of course comparable with the full cross-seat construction which is used in the other cars shown.

Due to the variations in size and weight of cars, it is impracticable to obtain any figures to represent the average practice as regards rated horsepower of motors installed. Since the total passenger carrying capacity of a car is roughly proportional to its length, it was therefore considered of some interest to add a column showing the rated horsepower of motors per ton of light car weight per foot of over-all length. Although the motor capacity required varies of course with the type of service in which the car is used, a weighted average of this last-mentioned column gives some indication of the general tendency or rather the general requirement as to motor capacity. This figure is shown to be 0.151 hp. per ton of light weight per foot of length. Applying this figure to the average weight of 35,754 lb. and the average length of 45 ft. 1 in. shows a required capacity of 122 hp., which is approximately equal to four 30-hp. motors or two of 60 hp. motors.

The results obtained in connection with the arrangement of steps and platforms may be analyzed in a rather interesting manner by utilizing the figures shown in the column headed "Height from Rail to Platform Floor at Side Knee per Inch of Wheel Diameter." This column was prepared in order to eliminate the differences in wheel diameter so as to study the effect of level platform or drop platform construction on step height. A weighted average of the figures in this column for cars with the level platform type of construction shows a value of 1.125 in. to the platform per inch of wheel diameter, whereas a value of 0.971 in. is obtained for the same dimensions where drop platform construction is used. Applying these figures to a 26-in. diameter wheel, we obtain an average height of 29¼ in. from the rail for flush platform construction and 25¼ in. for drop platform construction, as represented by all of the cars shown in the table. Allowing 13 in. for the step from the side knee to the step, this gives an average distance from the step to rail of 16¼ in. with the flush platform construction, compared with 12¼ in. with the drop platform construction. As pointed out in a subsequent chapter, there is a considerable question as to whether the advantages of the flush platform type of design from the standpoint of increasing safety and speed of passenger movement is not very largely, if not entirely, offset by the necessity of maintaining somewhere near an average of 16 in. for the initial step from the rail, as compared with 13 in., which is made possible by the incorporation of a comparatively low step at the end sill with the drop platform construction.

Table IV presents the same general classification of data for one-man and one-man two-man interurban cars ordered during the first six months of the current year. This table gives what in some respects is rather surprising information, in that both the length and weight of cars shown are less than that for corresponding types of cars designed for city service. No. 16 gage side sheet material appears on a number of cars and the arch roof is again used on all cars reported. Likewise, 26-in. diameter wheels and four-motor equipment seem to be universal on this type of car. Forty-five cars of this type were built during the first half of 1923, out of a total of eighty-two interurban cars built, which is 55 per cent. This is comparable with exactly the same number (forty-five) of one-man two-man interurban cars built during the entire year of 1922 out of a total of 183 cars built. This represents 24½ per cent of the total. It is therefore evident that for certain classes of interurban service there is the same strong tendency toward the use of light-weight one-man or one-man two-man cars that is noted in connection with cars for city service.

Curved-Side Light-Weight Interurban Cars of Youngstown & Suburban Railway Are Extremely Light in Weight and Paneled with Steel-Covered Plywood

Chicago, North Shore & Milwaukee Branch Line Car Is of Curved-Side Construction with Folding Doors and Steps

Type of High-Speed Interurban Car Used by Interstate Public Service Co., Indianapolis

Facilities for Expediting Passenger Movement

Making the Place of Business Convenient

The general design of the car is determined by the necessity for expediting passenger movement. Low floors and steps, together with door and seating arrangements, are important factors. High schedule speeds require large loading reservoir capacity and power-operated doors. One-man operation introduces special problems and devices

IMPROVEMENT of the facilities for insuring the rapid, safe and comfortable movement of passengers on, off and within the car have been the governing factors of influence in molding the general arrangement of the electric railway car body. The basic and widespread effect of the successful institution of one-man operation to meet the inexorable combination of economic conditions which the electric railway industry has had to face has also resulted in a decided tendency to extend the field of one-man operation by the development of various devices for controlling the interchange of passengers. The necessity for rapid and efficient collection of fares is still another important element which has affected the design of car bodies. Marked improvement in devices to expedite this work and speed up passenger movement has recently been made.

EFFECT OF BODY DESIGN

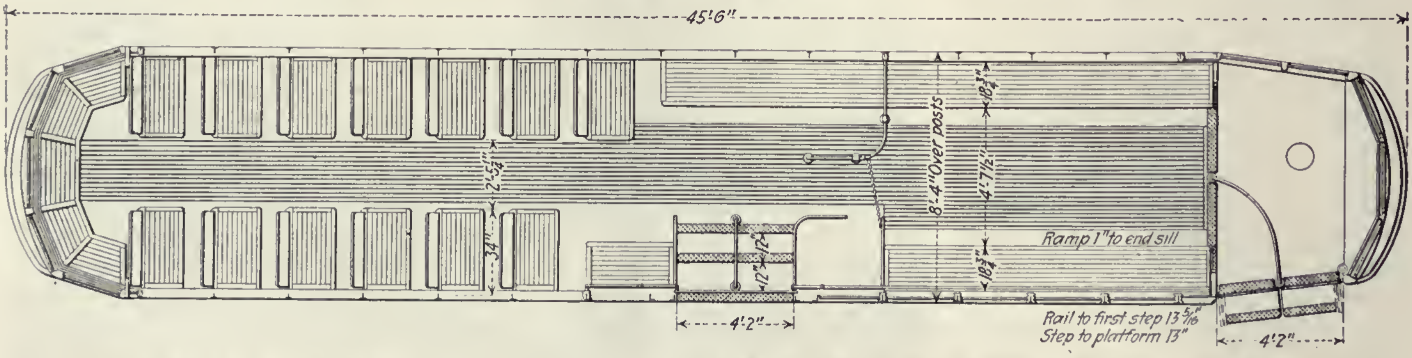
The conditions which determine the measure of success of a given design of car body for facilitating passenger movement are listed below. Their importance as basic elements increases with increase in passenger density, frequency of stops and required schedule speed.

1. Height of car floor above the rail.
2. Arrangement of doors for the entrance and exit of passengers.
3. "Reservoir capacity" of loading area.
4. Design of doors, steps and operating mechanism.
5. Width of aisle.
6. Arrangement of seats.

The height of the car floor has a direct bearing on the number and height of entrance and exit steps. The importance of keeping the number of steps to a minimum and of making the height as small as possible has been recognized by designers for a number of years. The beginning of the definite movement toward reducing car floor heights to a minimum had its inception in Pittsburgh and finally culminated in New York with the "stepless" car. The work in Pittsburgh on this subject resulted in the conversion of motor manufacturers to an appreciation of the necessity for designing motor equipment which could be put on trucks equipped with wheels of smaller diameter than had been the practice up to that time.

The New York cars provided a design in which the passenger would step directly from the street to the car floor, and resulted in some very radical changes in car structure and also in the location of equipment. This type of car probably marked the extreme of the tendency toward low-floor construction. Cost of construction and unfavorable appearance were factors which probably prevented its further adoption.

The Exit Door Used on One-Man Cars in Chicago Opens When Passenger Steps on Treadle and Closes Automatically When He Clears the Step



On the New Front-Entrance Center-Exit Cars of the Philadelphia Rapid Transit Company an Initial Step Height of 13$\frac{5}{16}$ In. from the Rail Is Obtained by the Use of an End Sill Step at the Front End

Both the New York and Pittsburgh developments were carried out on cars of the center-entrance type. Consideration of subsequent practice is closely allied with the second factor in the problem of passenger interchange, namely, arrangement of doors.

Efforts to fit the car to the type of service in which it is to be used have resulted in the following combinations of door arrangement and type of operation:

1. Rear entrance and front and rear exits with crew of two.
2. Center entrance and exit with crew of two.
3. Center entrance and front exit with crew of two.
4. Front entrance and exit with crew of two.
5. Front entrance and center exit with crew of two.
6. Front entrance and exit with crew of one.
7. Front entrance and rear exit with crew of one.
8. Rear entrance and front exit with crew of one.
9. One-man two-man designs with end-door construction.
10. One-man two-man designs with front and center-door construction.

Considering first the general subject of end-door cars in which some form of platform structure is provided, the recent tendency has been to build the platform flush with the body floor and to provide only a single external folding, or internal stationary step to break the distance from the platform floor to the ground. This is particularly true in a large proportion of the recently constructed cars designed for either one-man or one-man two-man operation. Although 24-in. wheels have been used in some few cases, the 26-in. wheel seems to be most generally favored for four-motor equipment on this type of car. With this diameter of wheel it becomes difficult to provide much less than a 16-in. step above the rail, if the flush-type platform is utilized.

To overcome this difficulty while at the same time retaining the general effect of flush platform construction, there is a very general tendency in recent cars to ramp the body floor from the end sill toward the bolster. In many cases also a ramp is utilized from the center line to the side knee on the platform. This is done to help in reducing the step heights.

At this point another factor enters the problem. The use of two-motor equipment is favored for certain types of service in some cities. The provision of sufficient capacity in two motors for heavy city service limits the minimum wheel diameter to 28 in., and the resulting increase in floor height immediately complicates the problem of providing low steps. Under these conditions, a step from the body floor to the platform at the end sill is usually utilized.

The continued use of the end-sill step is illustrated in a number of the comparatively large recent car orders. There seems to be a basis for some question as to whether or not the advantages of the flush-platform type of construction have not been overestimated. The increased speed and safety of interchanging passengers due to lower steps, as made possible by drop platforms, may outweight the advantages of structural simplicity and reduced cost that go with flush-platform construction. It has been found in practice on some properties where the end-sill step has been retained that a step at this point tends, particularly in front-entrance cars, to encourage passengers to step on into the car body rather than to remain on the platform. The hazard of the additional end-sill step may be largely overcome by the proper provision of stanchions and grab handles. Furthermore, there seems to be some basis for questioning the superiority of a ramp as compared with an end-sill step from the standpoint of passenger safety. This is particularly true where a slope from the center of the platform to the door opening is included. In an accompanying chapter devoted to a study of tendencies in body design as represented by the cars ordered during the first half of 1923 the effect on step height of these two arrangements is analyzed.

STEP AND WELL ARRANGEMENTS FOR CENTER-ENTRANCE CARS

The structure of center-entrance cars readily lends itself to the inclusion of low step designs. The construction usually employed in recent cars may be divided into two general types, each of which is advantageous for certain classes of operation. In the case of front-entrance, center-exit operation with the pay-as-you-pass system of fare collection, encouragement of passenger movement toward the rear end of the car is an important element, and therefore the maintenance of a continuous level floor from the front to the rear half of the car is an important requirement. Consequently this class of car requires the use of an inside step at the center door.

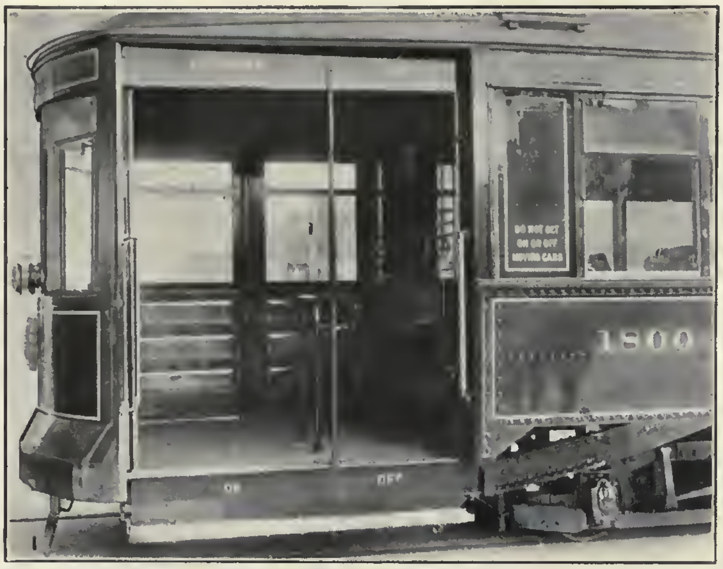
Where passenger loading and unloading are all carried on at the center of the car, the well type of construction may be used, and has certain advantages. Considered from the standpoint of step height, the well, particularly when combined with relatively slight ramps from the body bolsters, is considered by some operators to present a smaller hazard to moving passengers than does the inside step. The center well construction seems to be particularly favored for center-door trailers where brake rigging design and the suspension of apparatus do not become factors that cause mechanical complications.

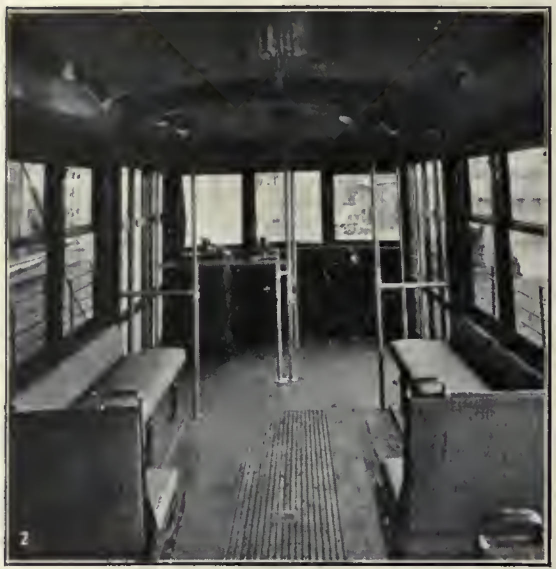
END-DOOR AND CENTER-DOOR CARS COMPARED

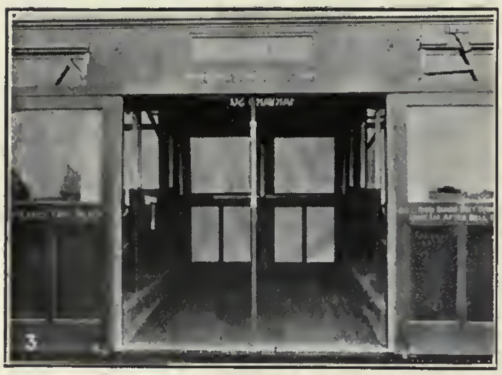
A comparison of end-door and center-door arrangements, together with several types of combined designs, is an important part of the study of car construction for safe and rapid passenger interchange. Experience has demonstrated that one of the fundamental requirements for effective operation through heavy loading districts is a large "reservoir capacity." This allows the entering passengers to be taken aboard and the collection of fares to be carried on while the car is in motion. In the end-platform construction, recognition of this principle is reflected in the long platforms utilized on properties where heavy passenger peaks are handled. The long platform, however, is a difficult structural problem and involves increased first cost and weight and higher maintenance expense.

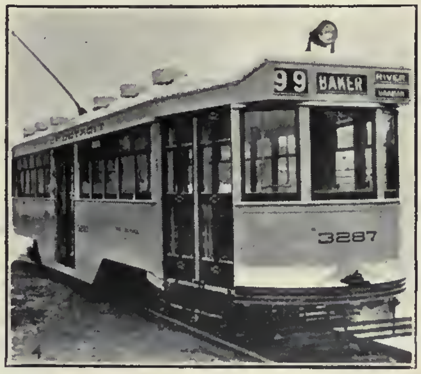
The center-entrance car, with or without a front exit, which has been used by a considerable number of properties, has the inherent defect of limited reservoir capacity. The extremely ingenious methods which have been devised for overcoming this limitation as applied to trailers where only one man is available are discussed in the chapter on train operation in connection with the types of trailers adopted by St. Louis and Toronto.

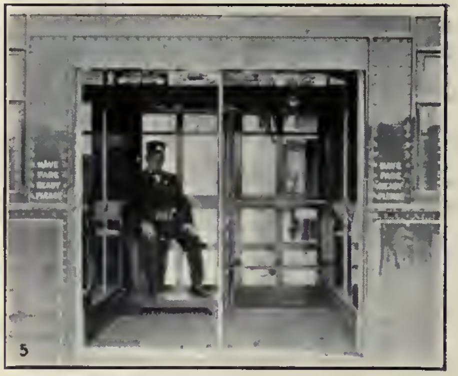
The Peter Witt type of car, which was originally developed in Cleveland to obtain large "reservoir capacity," has proved very successful and has

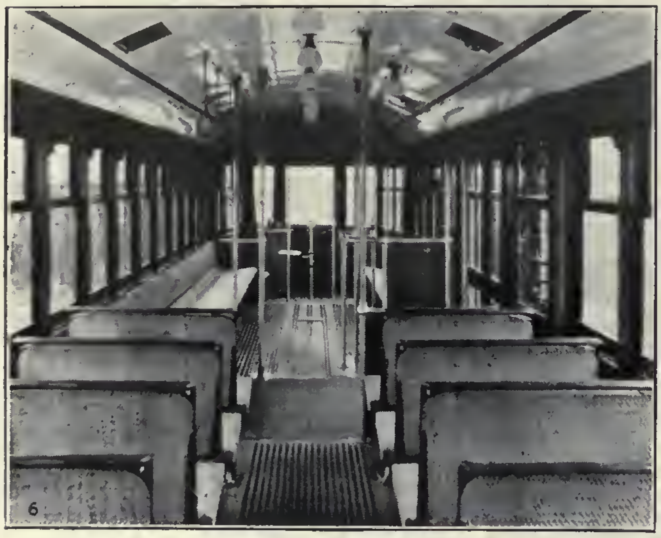


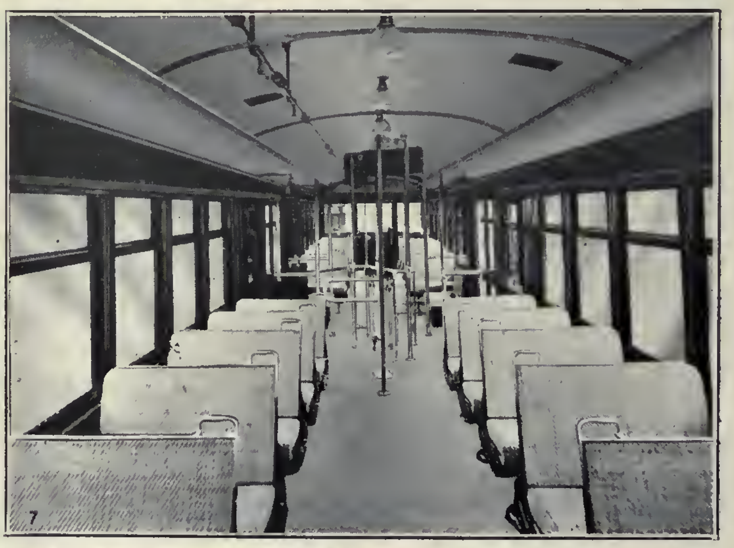










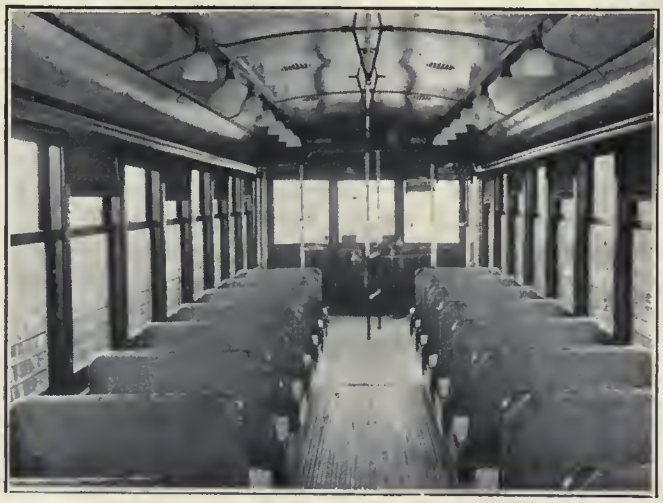


1. A type of end platform car of the Chicago Surface Lines for handling heavy passenger interchanges at high schedule speeds has very low steps.

2. The one-man two-man cars recently put in service by the Muskegon Traction & Light Company have flush platforms with a ramp from center line to side knees.

3. Outside-hung doors simplify body construction on center-entrance surface cars of Boston Elevated Railway—ramps give low step to ground.

4. New Detroit Peter Witt cars have folding steps at front end.



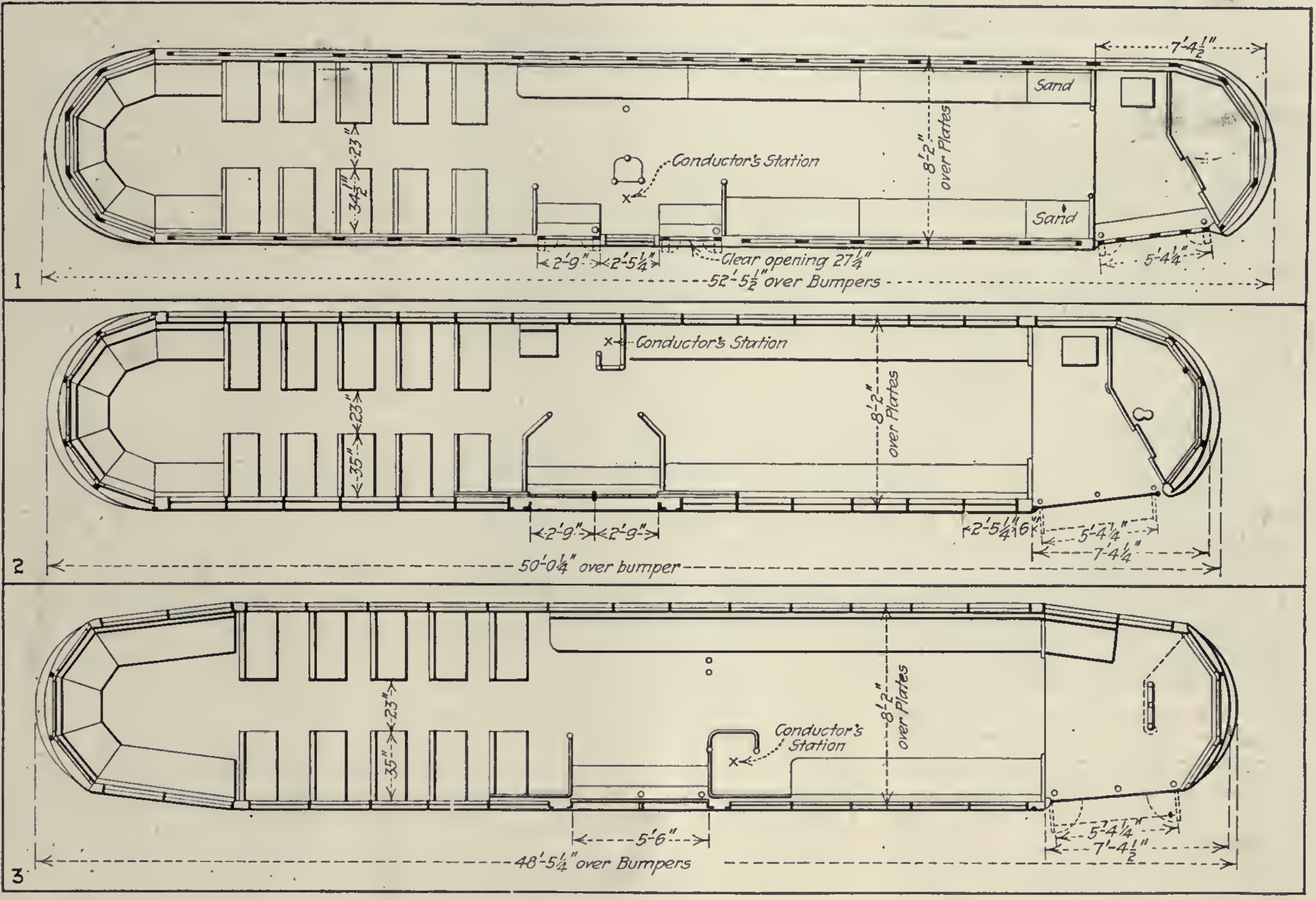
5. Increased reservoir capacity is obtained in center-entrance Chicago trailers by placing conductor in far corner of well.

6. Interior Detroit Peter Witt cars—safety treads are installed in floor in front of longitudinal seats.

7. A 36-in. aisle and adjustable barriers are provided in the Pacific Electric center-entrance cars to facilitate passenger movement.

8. An over-all car width of 9 ft. 1½ in. enables a 30-in. aisle to be provided in the new one-man two-man cars of the San Francisco-Oakland Terminal Railway.

been widely adopted by many cities for operation under heavy traffic conditions. In this design the entire front half of the car is utilized as a loading space and the principle of collecting fares while the car is in motion has been fully applied in the arrangement adopted. This type of car has become very popular and there has been a recent tendency to adapt this construction to the design of one-man two-man cars.



The Conductor Is Placed in Various Positions on Pay-as-You-Pass Cars in Different Cities. (1) Cleveland, (2) Akron, (3) Detroit

DOORS AND STEPS THAT SHORTEN THE STANDING TIME

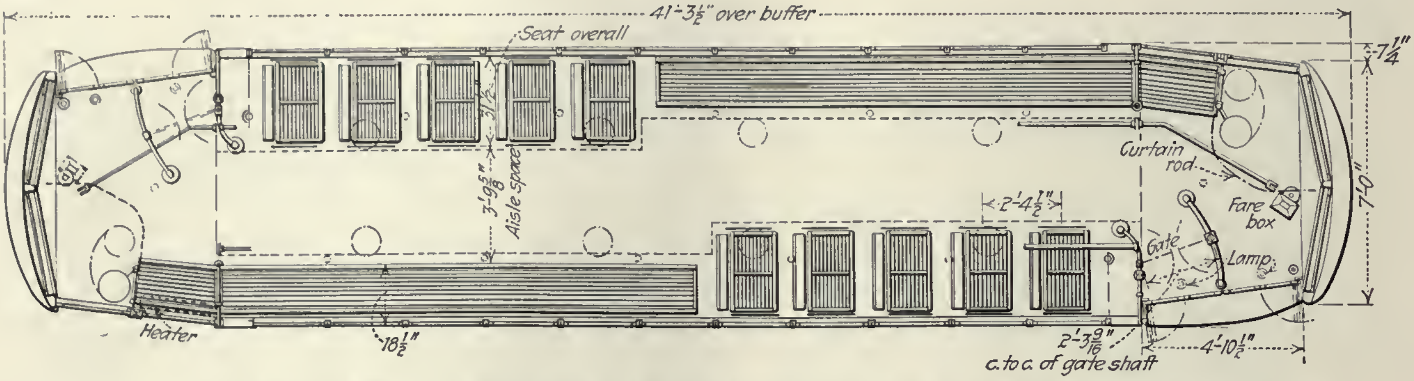
The design of doors and steps, together with their operating mechanism, has an important bearing on the success of the completed car in carrying passengers *en masse*. The adoption of devices which will insure greater speed and safety in door operation even at the expense of slightly increased initial cost and maintenance is being generally favored. The primary objectives in modern door design are maximum practicable door openings, maximum speed with safety in opening and closing, minimum space required in operation, and the elimination of the personal element in insuring safety of passengers.

Pneumatic operation of surface car doors represents the modern method of obtaining these objectives. Power operation speeds up the door movement, relieves the operator of manual duties and enables him to devote more attention to the collection of fares and the questions and safety of passengers. It also lends itself to various combinations of interlocking apparatus for safeguarding operation and permits control of the doors from any desired point. The perfection of devices for the safe operation of doors has been largely responsible for the return to favor of train operation on surface properties. It is also true that the very high degree of efficiency which has been developed in the operation of long trains of multiple-unit cars in rapid transit service, both on elevated and subway lines, has been closely allied to and dependent upon the development of pneumatic door operating and interlocking mechanism.

Although various installations of electric door operating mechanisms have been made from time to time, this form of apparatus has not been very widely favored. Experience has demonstrated it to be generally heavier and more costly than pneumatic apparatus. In addition the pneumatic type of door engine lends itself particularly well to the accomplishment of speed and flexibility in the door operation. It not only enables the greater part of the door movement to be effected rapidly but provides a sudden choking or cushioning of the final closing or opening operation. Another inherent disadvantage in electric door operation is that the device is inoperative when the electric power supply is off.

Difficulty with "frozen air" represents a primary disadvantage in pneumatic devices. By installing the equipment so as to insure proper drainage away from the door engine, this difficulty may be largely overcome. In addition, the modern practice of installing liberal cooling or radiating coils in the air piping from the compressor has made it possible effectively to prevent difficulties of this nature.

The design of pneumatic door engines has followed very largely the same course as other mechanical and electrical equipment described in the



On the Eastern Massachusetts Street Railway One-Man Double-Truck Cars a Wide Aisle Is Obtained by Staggering the Cross and Longitudinal Seats

article on that subject. Reductions in weight and size, improvements in methods of manufacture, and substitution of higher grade and lighter weight materials have been the general developments. Aluminum has been successfully used for the housing castings of door engines without greatly increasing the cost. It is probable that when the method of handling this material through various manufacturing processes is better understood, it will be more generally used.

Comparison of Sliding and Folding Doors

Car door construction is generally of either the folding or sliding type. Each of these types is particularly suited for installation under certain combinations of conditions. The type which is selected for a given installation is determined largely by the relative weight which is given to certain advantages and disadvantages possessed by each design.

The sliding door enables a wider effective door opening to be obtained for a given size opening in the body structure. There is no projection beyond the body line when the door is open, or no "sweeping" area required in the opening or closing operation. This reduces the danger of catching passengers or striking them while the door is in motion. Generally there is also a lower cost of construction for the doors themselves due to the reduction in the number required and a simplification in the operating parts to be maintained.

Folding doors have the advantage of greater speed of opening and closing. With their use there is a simplication of body construction by the elimination of the door pockets necessary for the sliding type. The folding type allows independent operation of entrance and exit doors at the end platforms, and also permits of a lighter construction of door panels for a given size of opening.

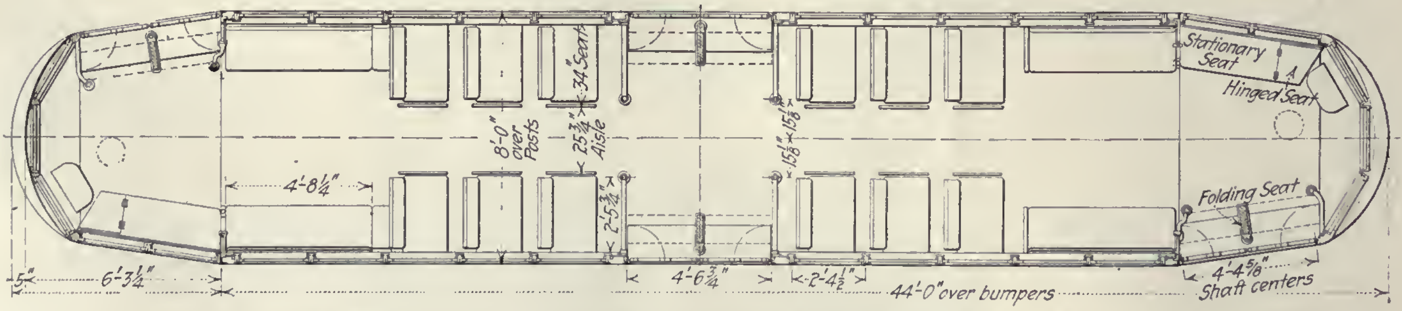
There is a general tendency toward the adoption of folding doors on cars with end platforms. To eliminate the necessity of having the doors sweep the platform, they are generally arranged to fold outward during the opening operation. The usual practice on end platform cars is to set the side knee in far enough from the outside line of the car to avoid an excessive projection of the doors when they are folded open.

In the installation of folding doors on center-entrance cars in Pittsburgh, an ingenious type of nonsweeping door design has been developed which very effectively eliminates both overhang and interior sweeping action. This arrangement is illustrated in an accompanying photograph.

Sliding doors have recently been installed on end platforms of double-truck one-man cars where either loading or unloading of passengers is allowed at the rear end of the car. Although this complicates the construction of the car body at the corner posts and necessitates the provision of sliding door pockets, this type of door was adopted in order to give the motorman an unobstructed view of the rear step from his mirror.

On center-door cars in Boston the problem of eliminating sliding door pockets has been handled by installing the doors on the outside of the car body. This effectively overcomes a difficult construction problem, but the appearance of the car exterior is not equal to that of cars on which pocket or interior construction is used.

The folding type of step was adopted in connection with the inclosed platform to prevent passengers from getting on the step after the car had started, or from securing a foothold for hanging on the outside while the car was in motion. Various types of folding step mechanisms have been designed and used. On a number of properties the stationary type step, however, is still retained and is said to present no greater accident hazard than the folding type. In some cases the stationary step is inclosed by carrying the doors down to the step line. On other recent cars this is not done and the step is allowed to remain exposed. With sliding doors on end platforms it is of course a very difficult problem to arrange the doors to inclose a stationary step.



New Brooklyn Front-Entrance Center-Exit Double-End Cars Are Designed for Two Men but May Be Operated by One —Cross Seats Are Used in Both Front and Rear Sections

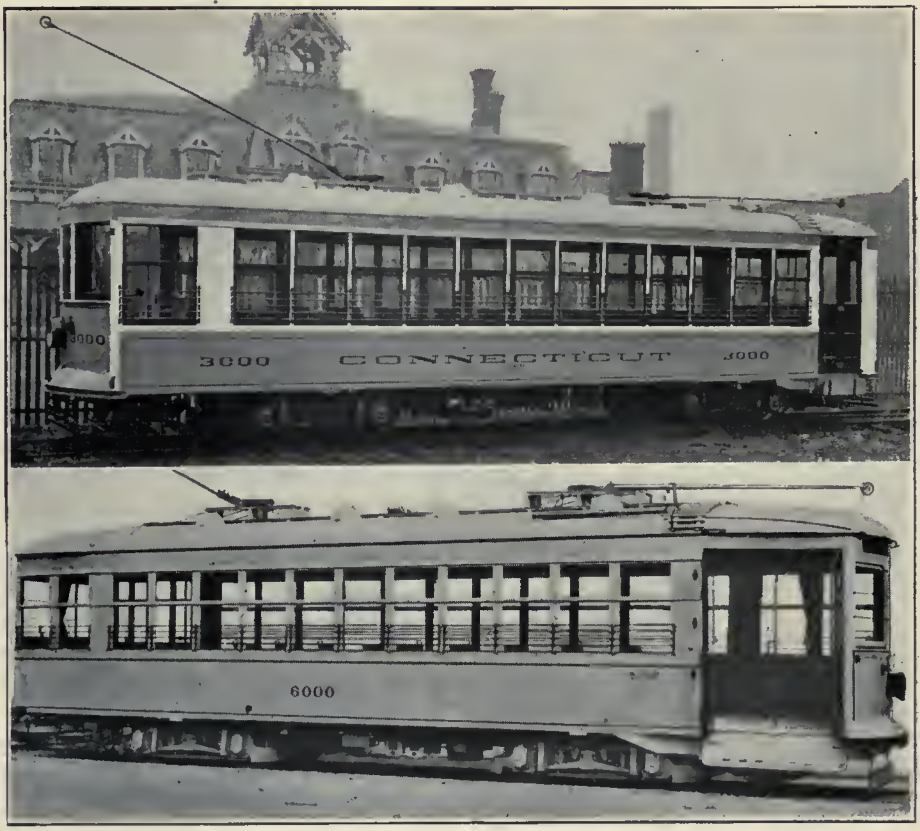
With the extension of one-man operation to double-truck cars and the spread of the use of more than one doorway for the interchange of passengers getting on and off, a number of devices have been developed for regulating the flow of boarding and alighting passengers. Several types of swinging gates have in the past been utilized, even with two-man cars in a few cases, for this same general purpose. Such gates usually consist of a light pipe or rod framework which swings open in the direction in which passenger movement is allowed at any given door opening. There is no attempt in such installations to accomplish more than simply to indicate to the passenger the proper door opening at which to board or alight.

Turnstiles of various designs have recently been installed on one-man double-truck cars by several properties. These installations have been made in connection with front-entrance and rear-exit, rear-entrance and front-exit, and also front-entrance and center-exit systems of operation. The primary object in the adoption of such a device has been to allow a passenger movement in one direction only at some point remote from the operator in order to secure a continuous circulation of passengers through the car instead of concentrating both the boarding and alighting movements at the front end.

The use of such devices for regulating passenger movement has required the sacrifice of considerable floor area for the installation of the turnstile. This has been partly overcome in some recent installations by the use of a turnstile in which the arms are movable within the center body and are guided by a cam so that they extend out only from one side of the assembly as the turnstile is rotated. This makes it possible to install the device close to the wall of the car and represents an improvement from the standpoint of space occupied.

Studies are also under way on an experimental car by the New York Railways for the purpose of developing a type of turnstile which can be moved from one side of the platform to the other so as to provide for double-end operation without devoting an excessive amount of room to the turnstiles. In this installation the turnstile is combined with the fare box in the same general manner as is carried out in station prepayment turnstiles used in the New York subways. There is one equipment at each end of the car. Passengers enter or leave at either end and pass through the turnstile, which is free to rotate for entrance but requires a nickel deposit to release it for exit. When the direction of car operation is reversed, the turnstiles are both moved from one side of the car to the other. This is accomplished easily by the one operator as the turnstiles move on a depressed track in the platform floor.

The type of turnstile most generally in use consists of a three-arm rotating member surrounded by railings made up of pipe. When installed at the rear end of a car it is set close to the side on which the doorway is located. The adjacent seats on this side of the car are removed and a circular seat built around the opposite side and end of the vestibule. For installation at the exit door of a center-exit car, the necessary room for movement of passengers from one end of the car to the other is provided by removing a section of the longitudinal seat along the wall opposite the door opening.



Above—Connecticut Company Double-Truck Safety Car Has Single Doorway
Below—Double-Truck Safety Car of Eastern Massachusetts Street Railway Company Is Provided with Separate Entrance and Exit to Facilitate Passenger Movement

The installation of a device of this kind materially slows up the movement of passengers. Experience in some localities has not been favorable to its use. In Duluth considerable trouble was recently experienced due to passengers refusing to pass through the turnstiles. Observations made in other cities using the arrangement indicate that in many cases the interchange of passengers is carried out entirely at the front end of the car, and the turnstile at the rear is seldom used. Some operators feel that there is no need for such an arrangement and that a passenger intent on beating his way can do so by slipping under or climbing over the turnstile or railing almost as readily as though no such barrier were provided. Whether the losses that would be met in the absence of a turnstile are of any moment is debatable. One company which has had extensive experience with a turnstile located at the rear door used for exit is now satisfied that the stile could be taken off. It no doubt was helpful in getting the passengers trained to the new plan of passage through the car but it is not needed as a means of avoiding losses of fares. People usually stand at the point where the front end of the car stops, anyway, and there is little disposition to board at the rear. One thing is fairly certain, and that is that however much the railway may value the turnstile as an insurance of getting all the fares, it is simply a source of inconvenience and annoyance to the passenger. If some form of barrier to prevent entrance through the unguarded exit door is considered necessary, it would seem to be an equally or more efficient scheme from the railway viewpoint, and a much more desirable plan from the passenger standpoint, to use the automatic door developed in Chicago, which is referred to again below.

The selector type of brake valve which has been designed in connection with the safety car air equipment offers a means of obtaining individual operation of entrance and exit doors where the double-door arrangement is utilized for loading and unloading at the front end of one-man cars. This consists simply of an auxiliary valve and handle incorporated within the brake valve so as to give the operator individual control of each door. Its purpose is to prevent entering passengers from boarding through the exit way and also to avoid having both doors open at every stop, which is particularly objectionable in cold weather. This device has been applied in Albany for controlling one door at the rear and one at the front of the car.

ONE-MAN OPERATION FACILITATED WITH AUTOMATIC DOORS

A combination of the ideas for controlling passenger movement and obtaining selective door control has recently been developed and applied to double-truck one-man cars in Chicago. In this arrangement a treadle is mounted in the exit passage on the plaform floor and is so arranged that the exit door is opened by a passenger stepping on the treadle when the operator's brake valve is moved to the door opening position, but is automatically closed as soon as the alighting passenger clears the exit step. By this arrangement passengers are prevented from boarding through the exit and at the same time free movement of alighting passengers is allowed by the elimination of any form of barrier.

This subject is particularly alive in the minds of railway operators today and is being discussed and approached from various angles. The broad principles of applying one-man operation to double-truck cars is so potent in its possibilities that a note of caution may well be sounded against a tendency toward the promiscuous application of one-man operation to a great many different types of double-truck cars.

There is unquestionably a limit to the size of unit which can be efficiently handled by one man. Attempts to operate with one man cars which were originally designed for two-man operation and which were entirely too large for the new service have resulted in making one-man operation so unpopular in some communities that this form of service has had to be entirely abandoned.

In new construction the rapid spread of the one-man two-man idea presents another subject for discussion and careful study. It is an open question as to whether or not the so-called one-man two-man car is not being designed in some cases so as to be very much more suitable for two-man than for one man operation. Although the desire to obtain what is in effect a universal type equipment by designing a car suitable for one-man or two-man operation as a single unit, or for three-man operation in a two-car train, is an exceedingly progressive and commendable ambition, there is at least some possibility of carrying this idea to a point where the resulting car is too large for one-man operation and at the same time does not have the necessary platform facilities properly to handle heavy rush-hour passenger loads when operated by two men.

In the design of a double-truck car for one-man operation or for one-man two-man operation, the car must be made smaller than the ordinary large two-man car or resulting difficulties in the proper handling of passengers will be encountered when it is in charge of only one man. In addition, if the passenger density on a given line is low enough to justify the use of one-man cars, the size and weight of the unit used, even when it is of the double-truck type, must at least be small enough to allow the use of shorter headways in order to keep a good frequency of service. When the car is so large that this cannot be done without excessive cost, one of the most important advantages of one-man operation from a merchandising standpoint is lost.

There is some doubt concerning the advisability of installing only a single door at the front end of a double-truck one-man car arranged in the same way as on the Birney single-truck car. But if the total car length is held to a reasonable figure and a proper aisle width and seating arrangement provided, it is believed that the use of a door remote from the operator for either loading or unloading is less desirable with one-man operation than the use of double doors at the front end. The best arrangement depends on the size of car used and becomes then a matter of balancing the advantages of the "circulation" idea against increased safety offered by the two doorways at the front end under the direct supervision of the operator.

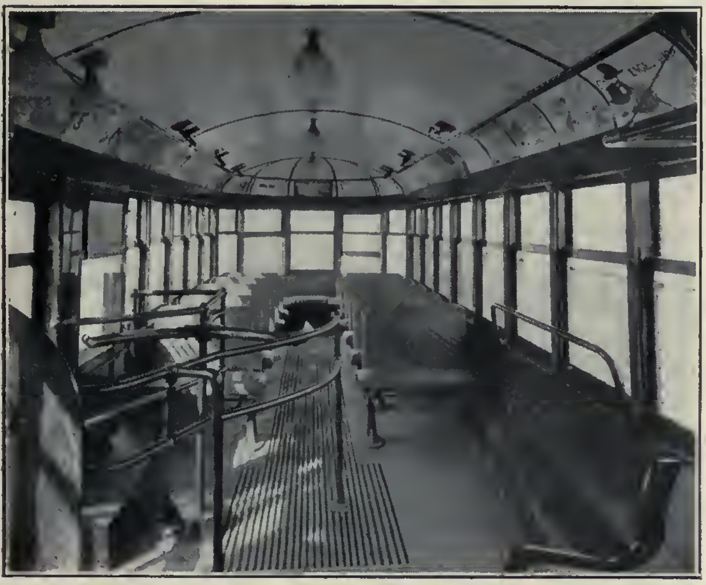
MEANS OF SPEEDING UP FARE COLLECTION

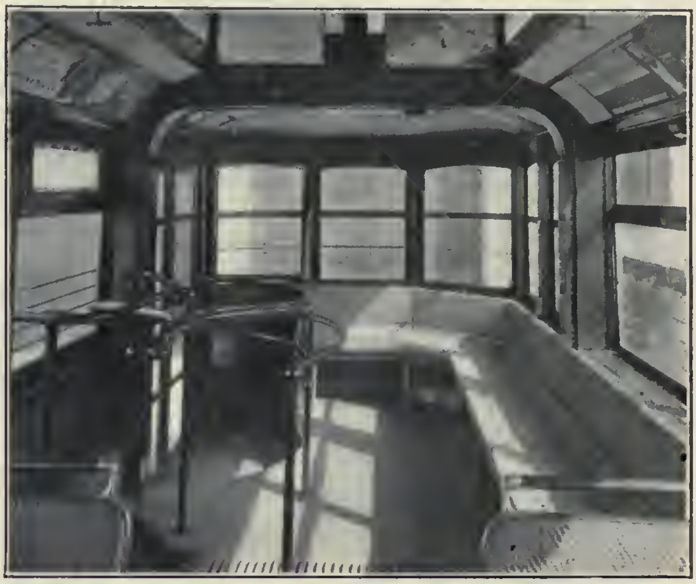
Rapid collection of fares is an important element in facilitating passenger movement, and the development of apparatus to assist in the collection and registration of fares is properly an important part of this subject. Probably more improvement has been made in this form of apparatus during the past five or six years than during the previous twenty. This is largely due to the greater opportunity offered for the development of such apparatus by the location of the conductor in one place on the car as the result of the general adoption of prepayment or post-payment systems of fare collection. The second incentive to development was the increase in fare on most properties from 5 cents, which could be paid with one coin, to 6, 7 or 8 cents, which required two or more coins. A still further stimulus has been the general use of the one-man car, which necessitated reduction to a minimum of the time and manual labor expended by the operator in the collection and registration of fares.

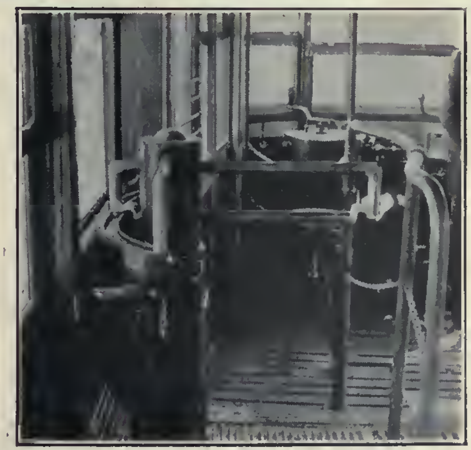
IMPROVEMENTS IN FARE BOXES

One improvement of the last few years in what is generally known as the "registering fare box" is the application of electric drive to displace hand cranking. Motor-driven fare boxes have been used for some time in prepayment stations, but it is only recently that it has been found possible to apply electric drive to car registering boxes without increasing materially the size and weight of the box. One such recent box, in addition to registering the fare in the usual way, rings up the fare on a register extending up above the box but forming an integral part of it. On account of the high cost, this type of box has not been put in wide use. In a more recent development of this type of box, the deposit of a coin in the slot establishes an electrical contact, which operates a separate overhead register before the coin passes to the inspection plate and into the motor-driven registering box. This particular fare box is being built for the Brooklyn City Railroad, whose fare is 5 cents. The box is so arranged that a nickel will automatically ring up only one fare, a dime will ring up two fares, and two dimes, if dropped in at the same time, will ring up four fares.

In the locked box, the principal improvement of the past few years has been to make the box safer and stronger and to increase the number of sizes to fit various classes of service. The lighter boxes can be easily moved from one end of the car to the other by one man and so are suitable for one-man car operation. Practice is about equally divided as to the use with the locked box of an overhead register to check the contents of the box or omission of the register.







Left, Turnstiles were applied at the center exit of Peter Witt type cars in Syracuse.

Right, Rearrangement of seats gave required room for three-arm entrance turnstile at rear end of Syracuse cars.

Below, Design of turnstile on experimental Third Avenue Railway car, New York, has movable cam-operated arms which reduce space required.

Overhead registers may be divided into two classes, those which make a printed record and those which do not. With the latter, when two different fares are collected, two single registers or a double register may be used. The double register plan is preferable because, being one machine, it will always show the last fare registered. For the same reason double registers are also more desirable than two single registers for registering both cash fares and transfers. Within the last few years overhead registers have been built so that they can be operated pneumatically or electrically by push button, coin switch or pedal, instead of by a pull cord. Other recent improvements have been in the direction of simplification and durability and in lightening the equipment.

The recording overhead register makes a printed record of the fares collected, with the number of the conductor and other pertinent information, and some types of these registers also tabulate the total amount of tickets, cash, etc., collected by the trip or day. Since the introduction of the one-man car this type of register has been adapted for operation by foot pedal, vertical rods or other methods particularly suitable for such operation.

In what is known as the portable recording register the principal recent developments have been in the direction of increasing the number of coins which the box will receive. Thus on one large electric railway the register takes nickels, dimes and tokens on the city division and nickels, dimes and quarters on the suburban division, as tokens are not used on these latter lines. These various coins are inserted through the same slot but register on different dials. With one-man cars, the register is not held in the hand of the operator, but is contained in a steel box, mounted on a post, and operated with a pedal.

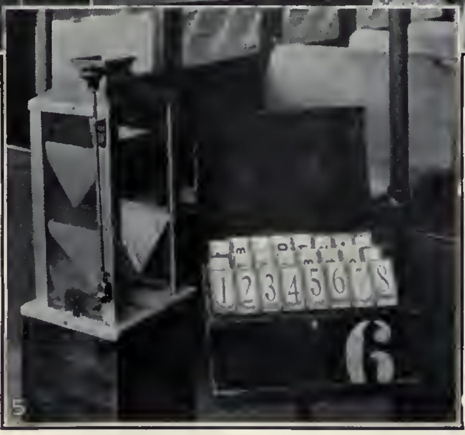
TRANSFER MACHINE

Several efforts have been made to devise a simple form of printing machine which can be carried on a car to print the transfers to be issued. Obviously such a device would be very desirable because the conductor need issue only the number actually required and there would be no waste, an unfortunate feature of any transfer on which the date has to be printed in advance. In such case, provision has to be made for a sufficient number of transfers to care for the needs of every issuing conductor, so that it often happens that many more transfers are printed than are actually issued. Nevertheless, transfer issuing machines have not been generally used.

The machine which is perhaps on more properties than any other carries a row of push buttons for the day, hour and rate, and when the proper ones are depressed and the machine is operated by a pedal, the transfer comes out in a manner very similar to the way in which tickets are issued in the booths of movie theaters. The time required is said to be three seconds per transfer as compared with an average of ten seconds for the hand-issued transfer.

There have been efforts also to develop automatic change-making machines, but for some reason or other they have not been generally put in service.

In addition to providing for rapid and safe loading and unloading of passengers, facilitating passenger movement also involves the problem of getting passengers to and from the seats in the car. This is a matter of seat arrangement and aisle width. Longitudinal seats provide a maximum free floor space and tend to encourage passengers to distribute themselves through the car. From the standpoint of passenger preference, however, heavy interchanges and relative short hauls furnish the only justification for their use. The combination of cross and longitudinal seats as used in the Peter Witt type car represents a happy combination, in that the passenger is offered the comfort of a cross-seat providing he takes the trouble of paying his fare in advance and moving to the rear half of the car. At the same time the large capacity loading reservoir desired in the front half of the car is obtained as the result of the use of the longitudinal seats in this section.



1. One form of registering box for one-man cars with transfer issuing machine also on platform.

2. Registering box with change tray.

3. A locked box in a center-entrance car.

4. One-man car operation with foot-operated recording register.

5. Fare box and zone checks for one-man interurban car operation.

The importance of wide aisles has been long recognized, and developments in car structural design have reduced the space taken by car walls to a minimum in order to give the maximum possible aisle width for a given over-all dimension of the car. Modern designs are also arranged so that the usual window rest does not decrease the effective seating width. Where the possibilities are taken into full account in the design, the passenger next to the wall on a cross-seat is in such a position that a portion of his body projects under the arm rest.

The methods of using cross-seats along one side and longitudinal seats along the other side of a car body, or of staggering this arrangement for the two halves of the car, have been used in various places to obtain greater effective aisle width. There has been some tendency in recent cars to cut the seat width down below 36 in. It is probable that this practice does not greatly increase the effective aisle width as the average normal passenger requires a minimum allowance of approximately 18 in., and even though the seats are made narrower than this, the effective aisle width remaining after the seats are occupied is the distance across the inside lining of the car less 72 in.

Another important element in providing for free passenger movement in and out of the car is the maintenance of clear areas on platforms and wells around doorways. The action of some regulating commissions in rating the capacity of service on the basis of the number of seats provided per hour has tended to encourage crowding of seats into the car and the installation of seats within areas that should be maintained free for passenger movement. This same tendency has resulted also from the general practice of comparing car weights on the basis of the weight per seat.

Newer Methods in Body Construction

The Success of Any Structure Depends on the Design of Its Parts

Light-weight car developments have resulted from the application of new and ingenious structural methods. The addition of double doors to safety cars, construction of curved side cars, "T"-post application to double-truck cars, pressed-steel side posts and unique Minneapolis construction are among the developments in detail body design discussed

PROFITING by the many lessons learned and the economies derived from experience in the operation of light-weight single-truck cars with one man, engineers of the industry have been actively developing many new types of construction by the application of this experience to the entire field of electric railway rolling stock. As pointed out in a previous chapter one of the most outstanding general phases of this development has been the tendency to build light-weight, double-truck cars for operation either by one or two men. Attention was also called to a number of modifications in the dimensions, appearance and structure of the single-truck safety car. It was shown that there has been a parallel development going on in the construction of light-weight, attractive interurban cars and that this development has reached a stage where the operation of such cars in regular service with one man has been proved entirely practicable on a considerable number of properties.

It will therefore be of interest to compare some of the more important construction methods which have been adopted both in the further development of the single-truck car and also in extending this development to the double-truck car.

DEVELOPMENTS IN SINGLE-TRUCK CAR CONSTRUCTION

The type of single-truck one-man safety car which has been in general use weighs approximately 16,500 lb. when arranged for double-end operation and equipped with headlining and storm sash. The first important change from the original design was made in order to secure more rapid interchange of passengers. This was accomplished by the installation of a separate entrance and exit door. To accomplish this, the car design has been worked out in three ways; first, by virtually a simple elongation of the Birney construction; second, by a similar elongation but with considerable strengthening of underframe members; and third, by a complete redesign of the car. These methods are described in the next few paragraphs.

The first change is illustrated by the cars built for Madison, Wis., and Baltimore, which were among the earliest departure from the single-door design. The change involved primarily increasing the platform length sufficiently to provide for the extra door. The general structural features of the Birney type of car were retained. This included a light underframe and platform structure, continuous "T"-posts and carlines, No. 16 or 3/32-in. gage sheet steel on the side girders, and light tongue and groove poplar for the roofing material.

The Madison and Baltimore cars were made 4 in. wider than the Birney car, giving an aisle width of 26$\frac{7}{16}$ in. The increase in platform length resulted in an over-all dimension of 30 ft. 1 in. in place of 28 ft. ½ in., and increased the weight of the car approximately 450 to 500 lb.

In the cars recently built for the Chicago, North Shore & Milwaukee Railroad for use in Milwaukee not only was the additional platform length provided for double doors, but, while retaining the general body structural features of the Birney type car, the strength of the platform and bumper structure was increased materially. This was considered essential largely because of the fact that these cars will operate over track used also by the heavy steel interurban cars operating between Milwaukee and Chicago.

The end sill was made of 5-in. 6½-lb. channel in place of 3-in. 4-lb. Instead of the 4-in. 5¼-lb. channel cross-sill used between the end sill and the trapdoor opening on the Madison and Baltimore cars, the North Shore cars were built with a 10½-in. wide formed steel plate cross-member at this location. The bumper on the North Shore cars is made of 6-in. 8-lb. channel in place of 3-in. 4-lb. material. The platform knees are built-up members, made of a plate cut to the proper shape and reinforced with angles top and bottom, instead of the 6-in. 15½-lb. channels used on the Baltimore and Madison cars.

In addition to the above changes in structural detail, two center sills made of 3-in., 6.15-lb. channel are installed between the bumper and the bent plate cross-member described above. A continuous plate of No. 12 gage steel, 30 in. wide, is used as a buffing plate back of the bumper and is riveted to the side knees and center sills. The complete car is 29 ft. 6 in. long over bumpers and weighs 19,600 lb., completely equipped, of which 9,980 lb. is in the car body.

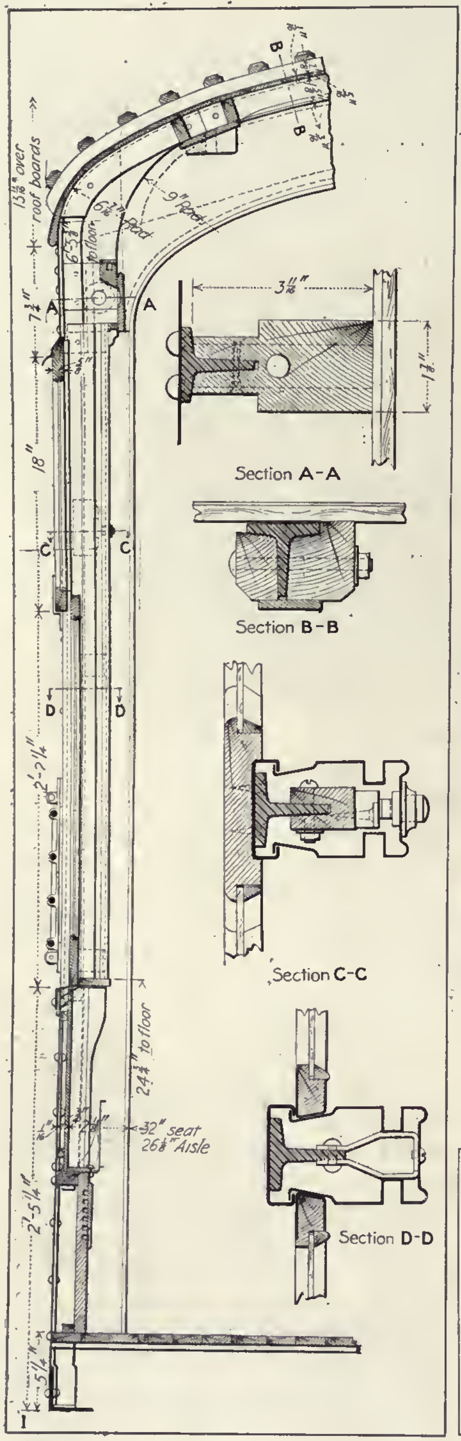
It is interesting to note that the North Shore line adopted the double-door car after two years of experience with a single-door type in Waukegan.

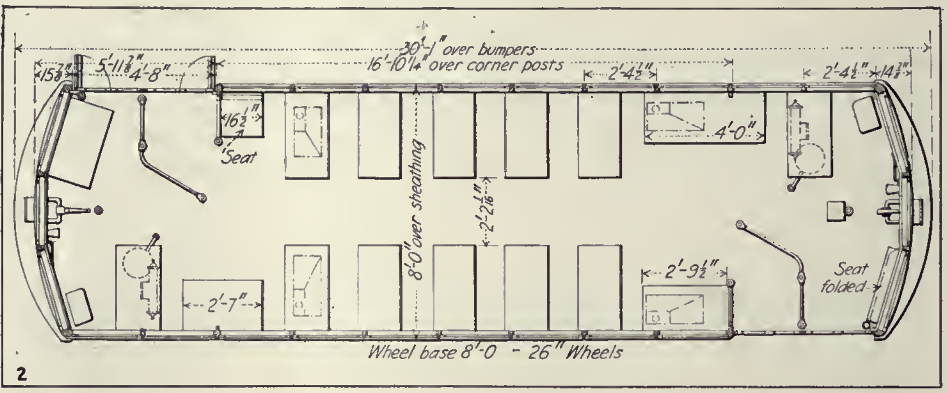
Up to this point in the development, the application of double doors to the single-truck type of safety car resulted in material increases in weight. But a sample car representing a complete redesign of the body structure was built in Chicago, which gives both the increased platform length necessary with double doors and the increased aisle width desired, without increasing the weight of the car. The general features of the body structure employed in this car were later applied to the design of a double-truck safety car, which will be discussed in connection with the development of the larger unit.

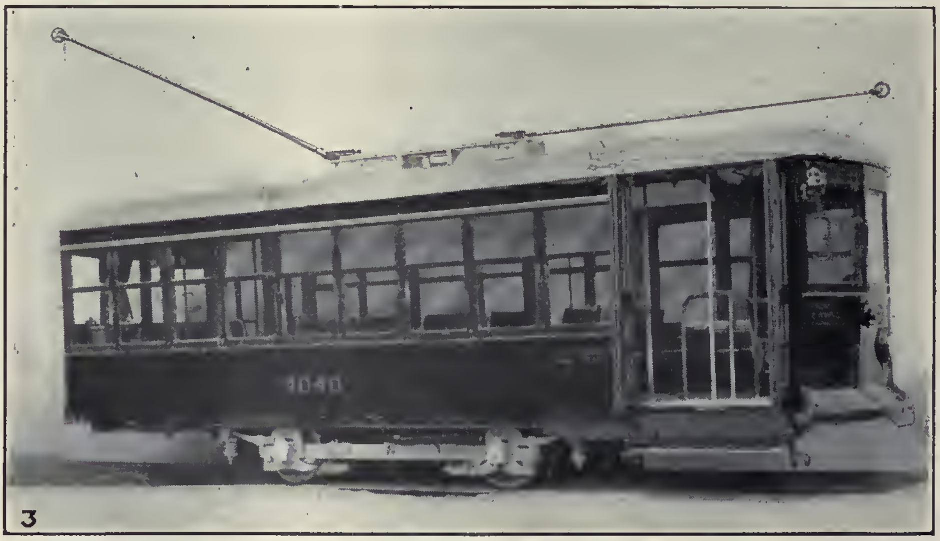
An accompanying illustration shows the general underframe arrangement of the Chicago single-truck car, in which a 4-in. 5¼-lb. channel bumper is used, and 3-in. 4-lb. channels form the platform cross-sills. The end sills are 4-in. 5¼-lb. channels and this same structural size is used for the first cross-sill at each end and at the center of the body. The intermediate cross-sills are made of 3-in. 4-lb. channel. The complete car has a total over-all length of 29 ft. 4½ in. and weighs 16,300 lb.

A still further departure from the original type of single-truck safety car is represented by the cars built for the Kentucky Traction & Terminal Company, in which a single door is used at the front end of the car for boarding passengers and a similar door is provided at the rear end for exit. Along with this unusual return to the arrangement of platforms used on early types of single-truck cars, this design presents many interesting developments in structural detail. In general the body construction is patterned after the light-weight curved-side double-truck interurban cars which have been in successful operation by this company for a considerable period. The curved side was utilized both for the purpose of increasing the effective interior width at the seat line and also with the thought of improving the appearance of the car.

The more important elements in the body structure are clearly shown in an accompanying cross-section. The outstanding features which are of interest and which represent marked variations from common practice include practically all of the elements in the side frame assembly. The side girder sheet is curved into a convex form immediately below the belt rail and tapers into a concave section just above the side sill. The widest dimension is at the belt rail,







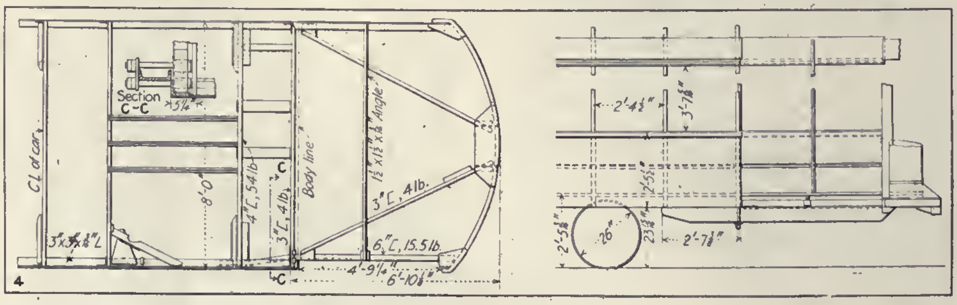
Construction Details of Baltimore Single-Truck Double-Door Safety Car, Illustrating Construction Adopted with Double Doors

1. Cross-section through side of car body shows "T"-side posts.

2. Short longitudinal seats are provided at each corner.

3. Side view shows additional facilities for entrance and exit.

4. End framing of car illustrates type of construction used to lengthen platform.



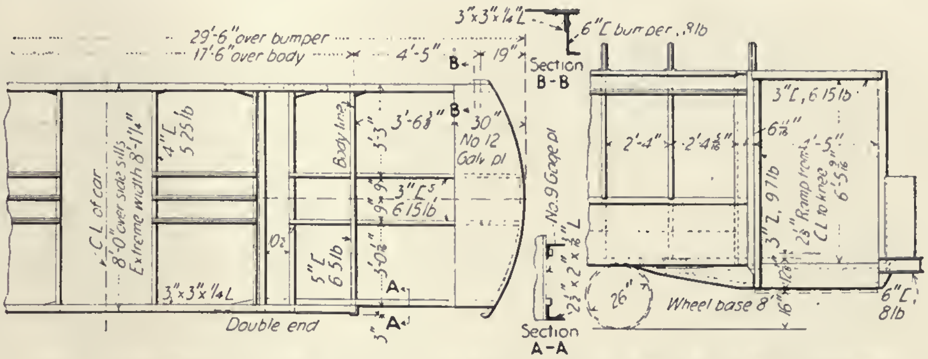
and the side posts are sloped in sharply so that a continuation of their outside line at the point of junction with the roof sheathing is approximately 3⅛ in. inside of the line of the belt rail. Similarly, the compound curve of the side girder draws the side sill 3½ in. inward and brings the lower edge of the body 3¾ in. inside the line of the belt rail. The general construction, in addition to giving this 3¾ in. additional vehicular clearance for a given over-all width at the seat line, is also said to allow the use of a wider car at the belt rail when conditions are such that the dimension across the drip rail or letterboard is the limiting factor in getting clearance between passing cars. This, it is claimed by some engineers, is a frequently encountered condition, because the clearance must be made sufficient at the top of the car to allow for side sway when passing over uneven tangent and curved track.

The curved side girder, although it has no increased strength in a vertical plane over the flat plate type of girder, is said materially to stiffen the body and increase the rigidity of the entire assembly for the same reason that corrugated iron is materially stiffer than flat sheet. In addition, this construction is said to eliminate the necessity for extending the side posts continuously to the floor line, and thus effects a saving in weight.

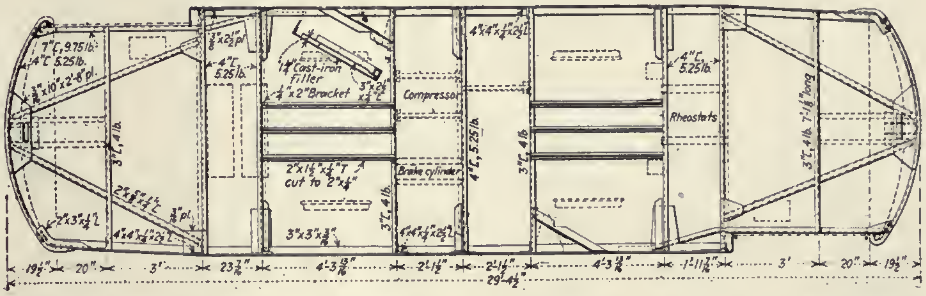
Vertical flanges or fins cut to the proper shape are riveted directly to the side sheet, and, extending at right angles to it, form substantial stiffeners. These members are designed to take the place of the customary extension of the side posts for this purpose, and when cars of this type are built for single-end operation, these stiffening flanges are riveted to the side sheet at an angle corresponding to the slope of the cross-seat backs to form the wall end of the seat structure.

The belt rail is a simple channel-shaped member made of sheet steel laid directly over the flanged tops of the vertical girder stiffeners just described, and also overlaps the outside of the girder sheet. An aluminum socket casting which forms a base for the short ash side post extending between the belt rail and the letterboard is held in place by a comparatively short, heat-treated, alloy steel bolt which is set in at an angle near the bottom of the side post and pulls the post, cap and letterboard together at this point.

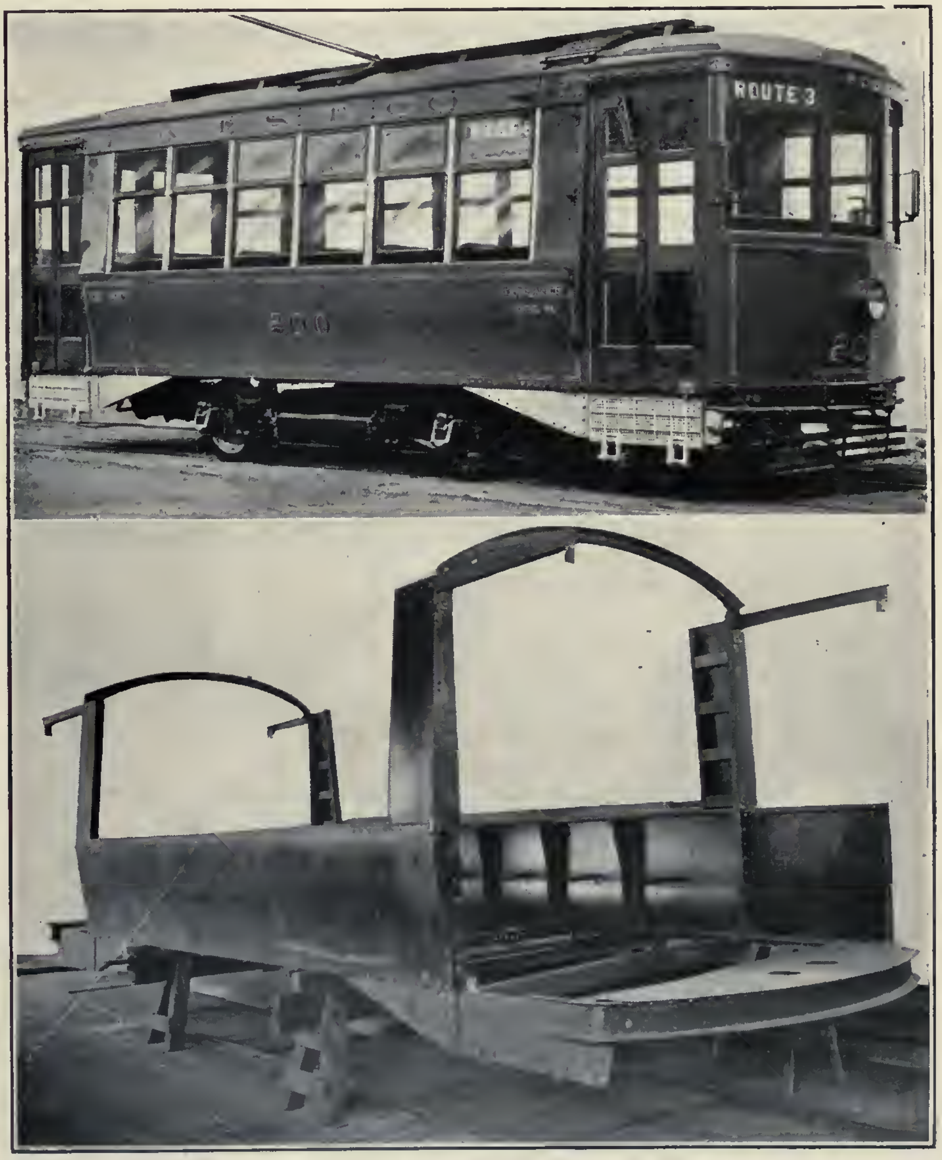
The side posts extend up to the



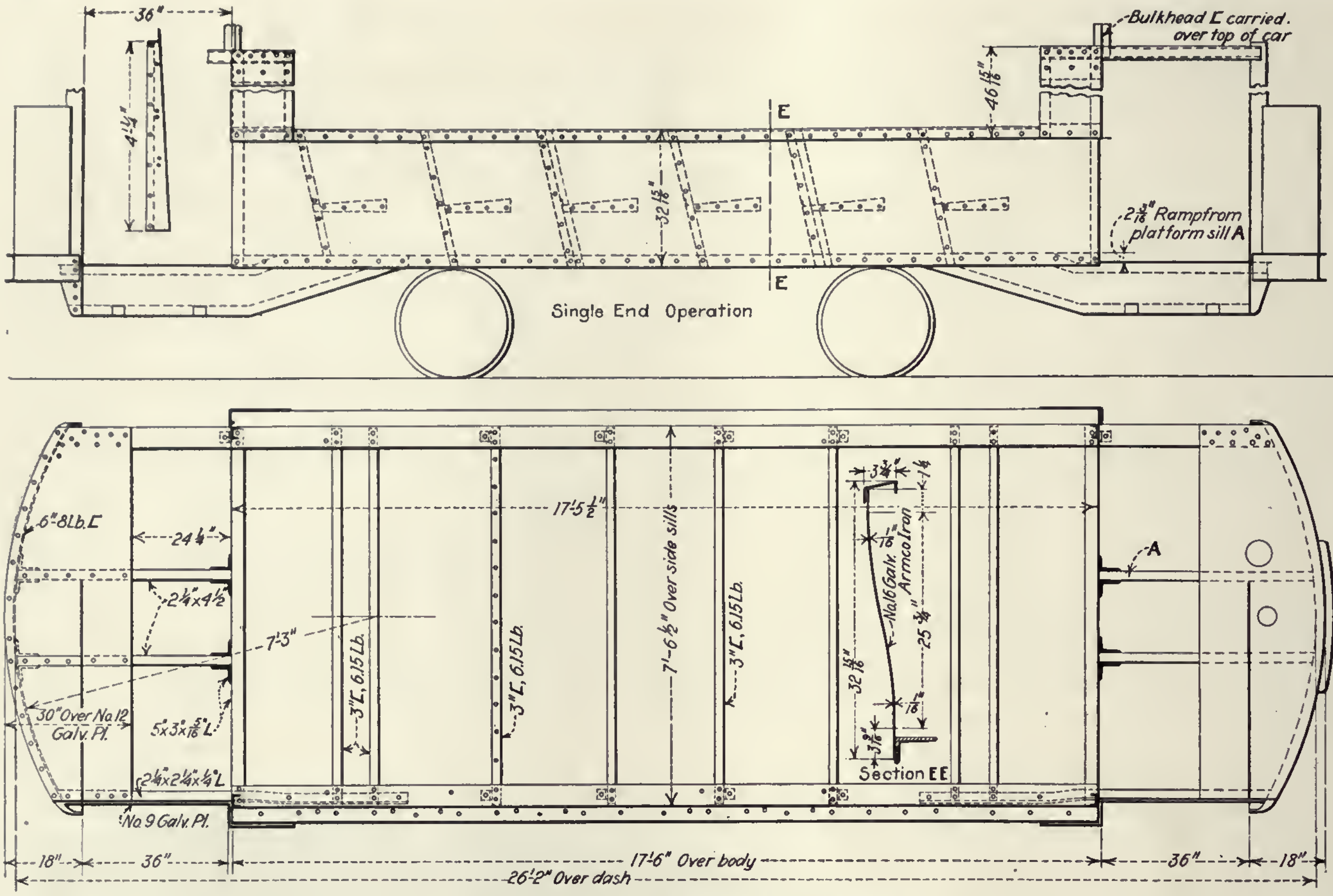
Steel Underframe of North Shore Line Single-Truck One-Man Car Was Considerably Strengthened by Heavy Bumper and Center Sills



Framing Plan of Chicago Sample Single-Truck One-Man Car Shows New Design Adopted



Above—Lexington Single-Truck One-Man Car Has Front and Rear Doors.
Below—Construction of Curved Side Framing

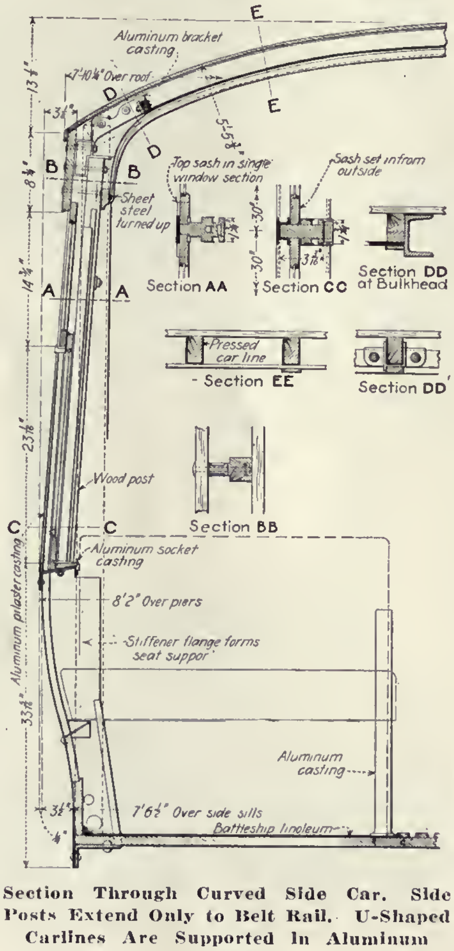


Steel Frame of Kentucky Terminal & Traction Cars. Side Sheet Stiffeners Riveted in Place at an Angle Form Part of Seat Frame. Corner Pier Construction Is Used

roof line. The customary wood top plate is entirely eliminated and its place is taken by the horizontal flange of the letterboard. An aluminum bracket casting is arranged to form a base for the pressed-steel "U"-shaped wood-filled carlines and is fastened to the side frame at each post by bolts extending through the side posts, bracket casting and wood letterboard. The "U"-shaped carlines are set in place with the open side of the "U" turned up The wood projects slightly beyond the upper edge of the steel and forms the means for fastening the roof sheathing in place.

As distinguished from general practice on the majority of cars built for some time past, the top sash is arranged in single window sections let in between the side posts, instead of being continuous. Cast aluminum outside battens screwed to the posts hold these sections in place. The method of installing the lower sash represents still another departure in design. These are set in from the outside and are also held in place by cast aluminum pilasters applied to the outside of the posts.

All of the above structural arrangement is well illustrated in the accompanying cross-section drawing. It will be noticed from an examination of this drawing that the lower side-sill angle is installed with the vertical flange projecting downward instead of upward as is customary. This is for the purpose of facilitating the assembly and it also makes it possible to replace readily a damaged side sheet without incurring excessive dismantling costs.



Section Through Curved Side Car. Side Posts Extend Only to Belt Rail. U-Shaped Carlines Are Supported in Aluminum Brackets

On these cars the floor is constructed of single thickness 1 1/16-in. tongue and groove wood flooring. It is covered under the seats with heavy battleship linoleum. The aisle is provided with the customary type of floor strips. The steel sides are lined on the interior with a layer of ⅜-in. thick compressed cork faced with 1/16-in. linoleum.

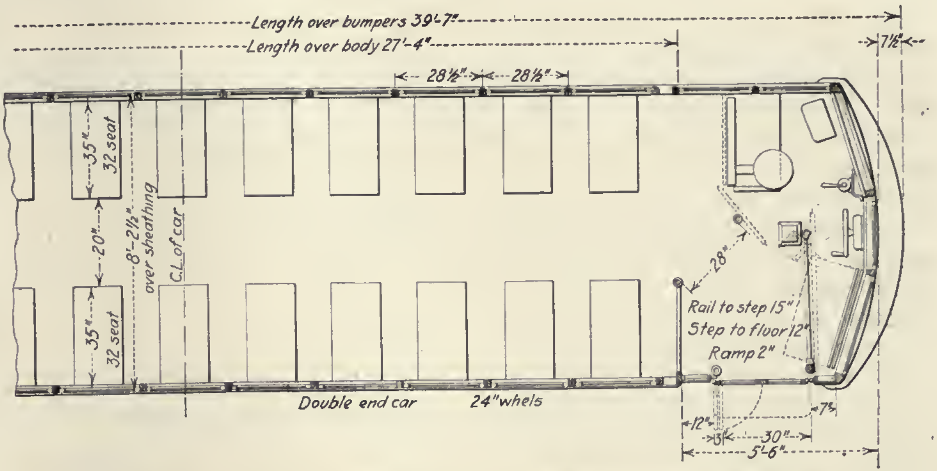
The arrangement of steel members in the underframing is similar to that in the North Shore cars previously described, and the details of the design are shown in an accompanying drawing. A feature of construction worth noting is the use of a continuous high carbon steel channel from side sill to side sill to form the corner post and header structure. A similar channel is carried out horizontally from the top of the steel corner panel as a vestibule top plate, and by this arrangement forms a load carrying member of the vestibule structure to supplement the built-up plate type of platform knees.

The doors and steps are of the folding type. The steps themselves, together with the lever arms which form the point of attachment for the step mechanism, are all formed as a one-piece, light-weight, aluminum casting. The cars are 26 ft. 2 in. long over dashes and 8 ft. 2 in. wide over belt rails. The weight completely equipped with plush upholstered seats is 16,600 lb., of which 9,820 lb. is in the body.

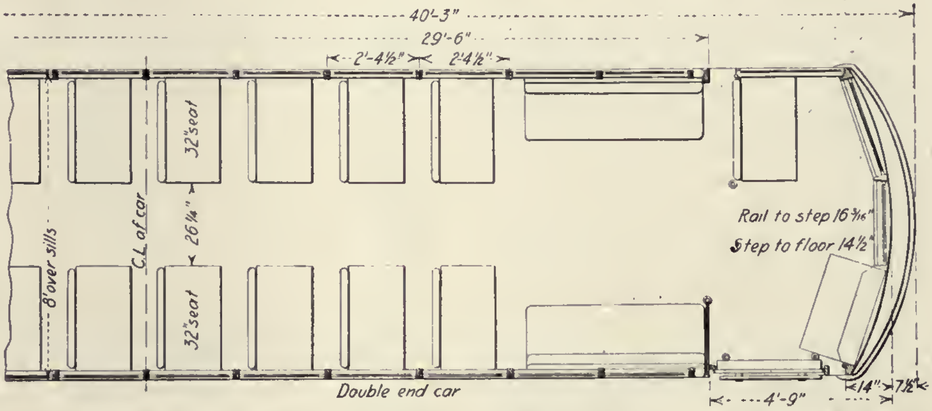
Birney Construction Extended to Double-Truck Cars

In a considerable number of one-man double-truck cars recently constructed the general features of the single-truck safety car design are extended so as to provide for the requirements of a double-truck unit, but remain intact as regards the principal features of the original construction. As in the case of the single-truck cars, some of these "elongated Birney-type cars" are provided with a single entrance and exit while others incorporate the wider double-door arrangement.

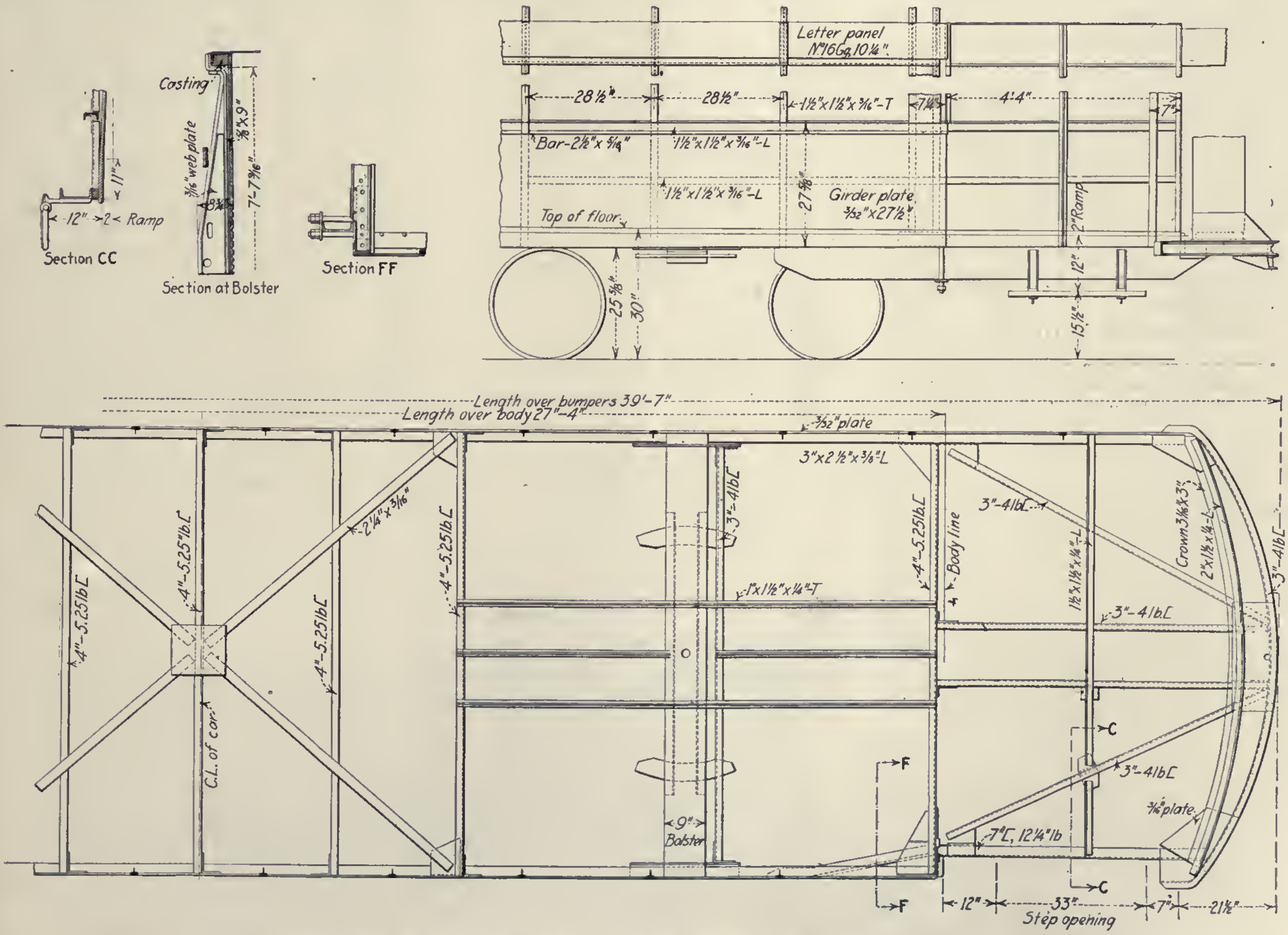
Framing details, floor plans and photographs illustrating typical cars of this group are presented in this chapter. All of these designs, though varying from each



Plan of Houston Double-Truck Safety Car Shows Seat Arrangement and Single Door



Longitudinal Corner Seats in Connecticut Company Single-Door Cars Increase Room

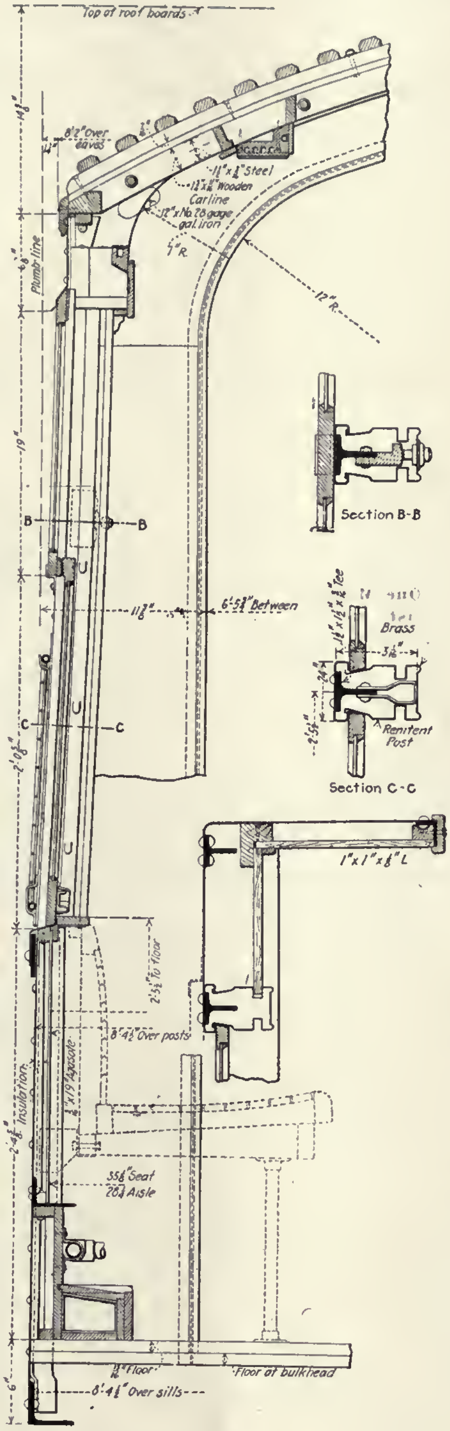


Framing of Houston Car Shows Arrangement of Steel Members for "Elongated" Birney Construction other in some details, represent essentially an extension of the type of construction employed in the Birney single-truck car. This includes the use of continuous "T" sections forming the side posts and carlines, and the use of a comparatively light vestibule structure. The weights of these cars vary from 30,000 to 32,000 lb. complete, depending on the type of equipment and trucks adopted.

The general features of car body design group themselves very largely around the type of side posts selected. A large number of cars have been built within a comparatively recent period in which the "T"-post design for the body side post is utilized, but various modifications are made in the method of applying it. One of the tendencies is to break the "T"-post at the top plate line and interpose some form of horizontal plate member to which both the top of the side posts and the carlines are fastened. In this respect at least many recently constructed cars are similar. In the details of underframe design, as well as in many details of the body structure, the various cars falling into this class represent a considerable range of ideas on the part of both operators and car builders.

The Boston type of one-man two-man car presents an interesting design utilizing this type of construction. In this car the pressed-steel letterboard is flanged over the top of the post "T"s and fastened by means of angle brackets riveted to the posts at this point. These same brackets are used to fasten the flat bar carlines.

The top sash is continuous. The posts have been bent inward from the belt rail so that the eaves molding is 1¼ in. inside the belt rail line. The lower sash are held in place by the renitent post construction in which a formed spring brass section is attached to the "T" side posts by clips, so that the sash is held tightly in place by the spring in the post material, but may be readily removed for repairs without the removal of any screws.



Modified "T"-Post Construction Is Used in Boston One-Man Two-Man Car

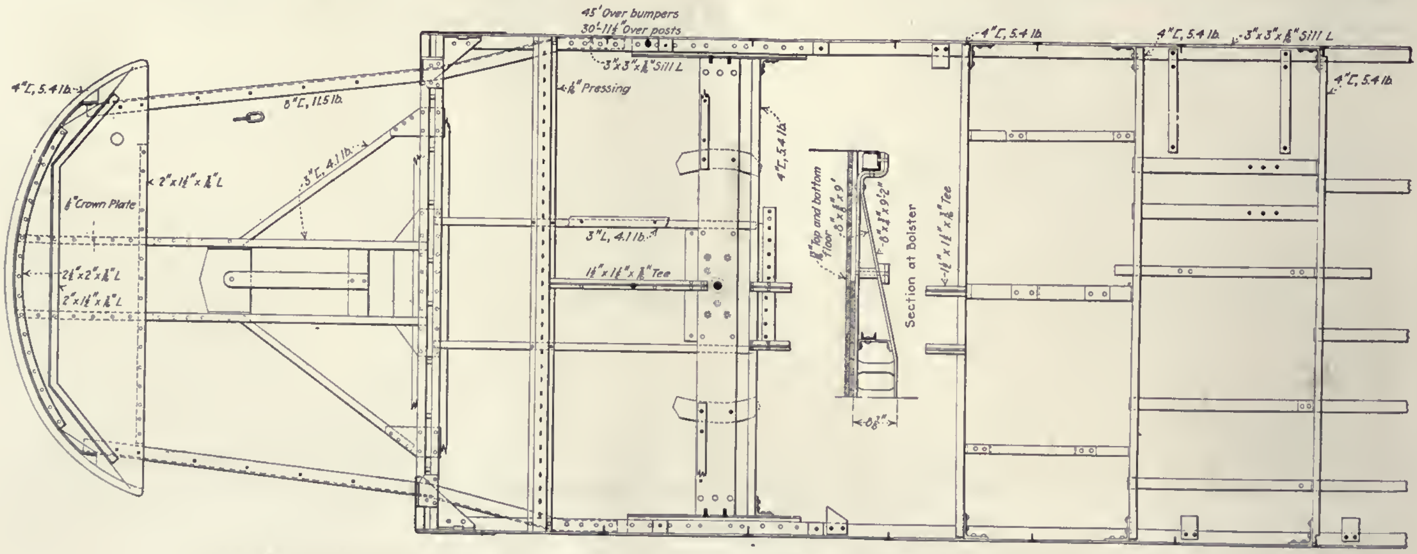
An accompanying drawing illustrates the design of underframe used and also indicates the size and location of the principal members. One interesting item of construction is the method of building the vestibule. All the vestibule posts are made of formed sheet steel, and a continuous steel top plate is carried around the ends of the car.

These cars are 45 ft. long over all and weigh approximately 31,000 lb. completely equipped.

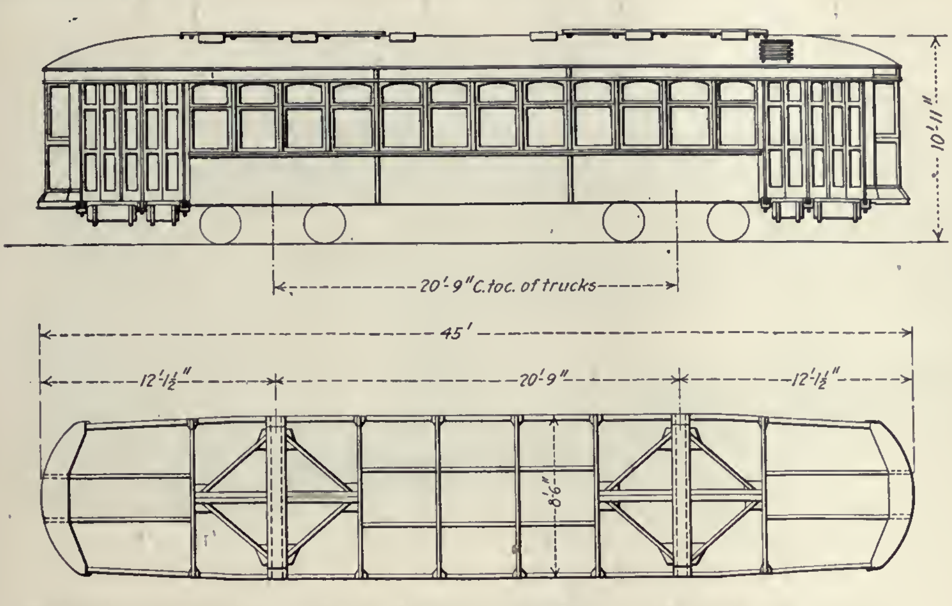
PRESSED-STEEL SIDE POSTS

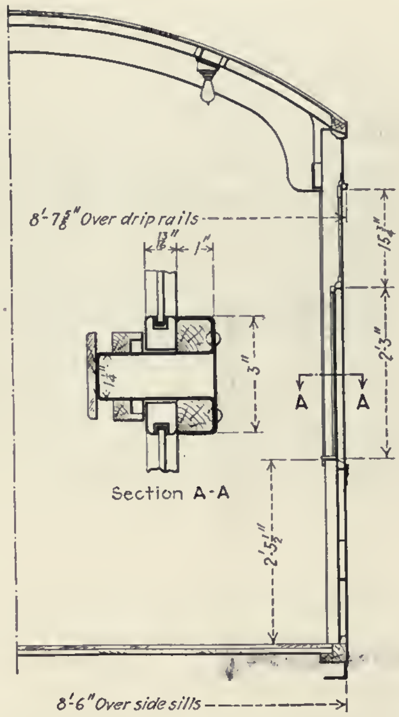
Although the conventional wood post is still being used to some extent, and the "T"-post design is represented by the majority of cars recently constructed, a number of interesting applications of other types of post designs have been made, and have resulted in the development of several outstanding forms of construction.

In the one-man two-man cars designed by the Milwaukee Electric Railway & Light Company the "U"-type post is used. A similar type has also been in use in Pittsburgh. The open end of the "U" is flanged and covered on the outside above the belt rail with a steel plate. Below the belt rail the flanges of the post are riveted to the side girder plate. On the Milwaukee cars the letter-



Steel Framing of Boston Car Provides for Use of Coupler. Bolster Is Built Up of Steel Plates





Framing, Elevation and Section of Milwaukee One-Man Two-Man Car with Pressed Steel Side Post Construction

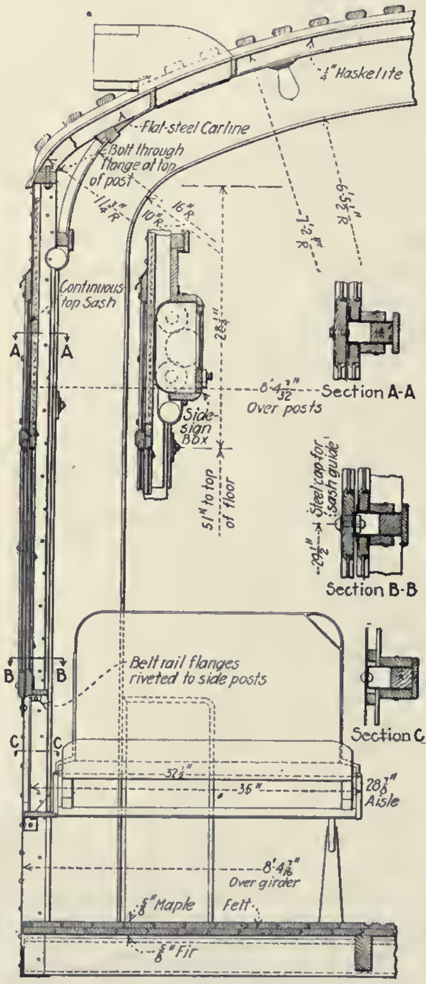
boards are made of the customary $\frac{3}{16}$-in. steel, but are reinforced at the door openings with ⅛-in. pressed-steel plates extending from the second body side post to the vestibule corner post, thus assisting in the support of the platform. Flat-steel carlines of 1¼-in. x $\frac{3}{16}$-in. material are riveted to the top flange of the letterboard and to each side post. These cars are 45 ft. over all and weigh approximately 32,000 lb. completely equipped.

An application of a different type of "U"-post is represented by the double-truck, one-man cars built by the Chicago Surface Lines. On these cars the open end of the "U" is not flanged and is turned toward the car interior. A wood filler is inserted in the open side of the "U" and is fastened in place by screws extending through the parting strips and post sides. This filler forms a screwing strip for the interior pilaster on the face of the post. The design enables the belt rail to be cut for the posts in such a manner that projecting flanges or ears are left at the sides of the opening and form a means of rigidly connecting belt rail and posts at this point. At the top-plate line the "U"-posts are flanged over, a light wood top plate is applied, and the flat steel carlines are bolted through the top plate, letterboard and side post flanges. The roof is constructed of large panels of plywood made up with waterproof glue and formed to shape. The completed cars are 39 ft. 7½ in. long over all and weigh approximately 31,500 lb.

Construction of Minneapolis Light-Weight Trains

All of the various types of construction so far described have been designed to obtain minimum weight and structural simplicity, while at the same time providing a construction which would have the strength and rigidity required to stand up satisfactorily in service. As previously pointed out, it is apparent in each design that the general arrangement of the entire structure has been built more or less around the particular type of side post and girder arrangement selected. Since the advent of the plate girder type of construction it has been the practice to fasten the girder plate on the outside of the body side posts below the belt rail and then to provide some sort of finish on the interior.

In the type of construction adopted on the sample light-weight train built in Minneapolis, this arrangement is not followed. The side posts are of 1½-in. x ¾-in. x ⅛-in. continuous rolled-steel channels installed with the flanges turned out and extending continuously over the car from



Left—Side View of Boston Light-Weight One-Man Two-Man Car with Ramped Flush Platforms. Right—The Chicago Double-Truck One-Man Car Has Pressed Steel Posts with Light Wood Filler, Aisle Width of 28⅞ In. Is Obtaineed for 8-Ft. 6-In. Over-All Width by Making Side Wall Only ⅜ In. Thick

In the Light-Weight Minneapolis Train the Outside Panels and Top Sash Are Made of Plywood Fastened to Wood

side sill to side sill. Flat steel plates, ⅛ in. x 10 in., are riveted across the post channels on the inside, one plate at the belt rail and a second plate at the lower side-sill angle. Diagonal flat braces, which are designed in accordance with the loads imposed and vary in size from 2½ in. x ⅛ in. to 5 in. x ⅛ in., are riveted from post to post across the backs of the channels between the belt rail and side-sill angle. The belt rail is also placed on the inside and is made of 2½-in. x ⅝-in. x 3/16-in. channel riveted across the backs of the side-post channels. Wood posts are fastened on the outside of the steel members and are let in between the channel flanges. A wood member along the belt rail and a wood intermediate rail are fastened on the outside of these fillers. The outside lower panels are 5/16-in. plywood material and are screwed and glued to the wood rails and posts. In general appearance, with the exception of the lack of rivets, the completed side resembles a steel plate after it is painted.

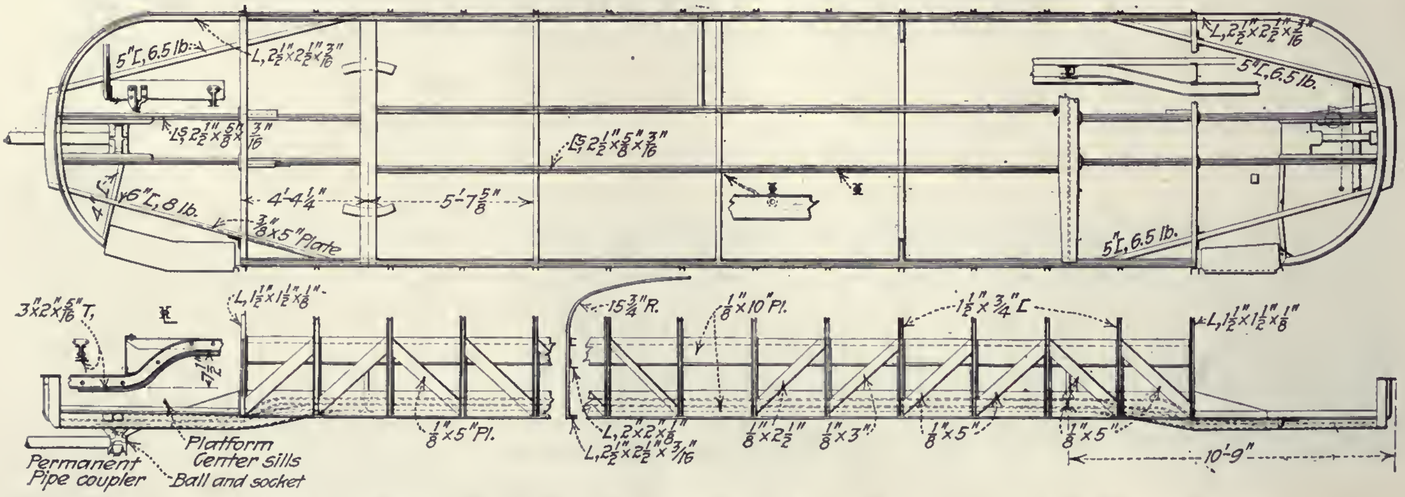
A lower side-sill angle 2½ in. x 2½ in. x 3/16 in. forms a support for the cross sills. It will be noted in connection with the type of construction employed that an over-all width of 9 ft. allows the use of the comparatively thick wall section adopted without interfering with the provision of ample aisle and seat width.

The customary upper sash is considerably modified on these cars. No letterboard is used. A continuous panel of 5/16-in. plywood is glued to the side posts between the roof line and the top of the lower sash, and rectangular cast aluminum frames containing glass openings about 8 in. x 14 in. are set into this plywood panel between each pair of side posts. The glass in these frames is arranged to slide horizontally. This enables a ventilating opening to be provided. This arrangement is discussed more fully in another chapter dealing with ventilation.

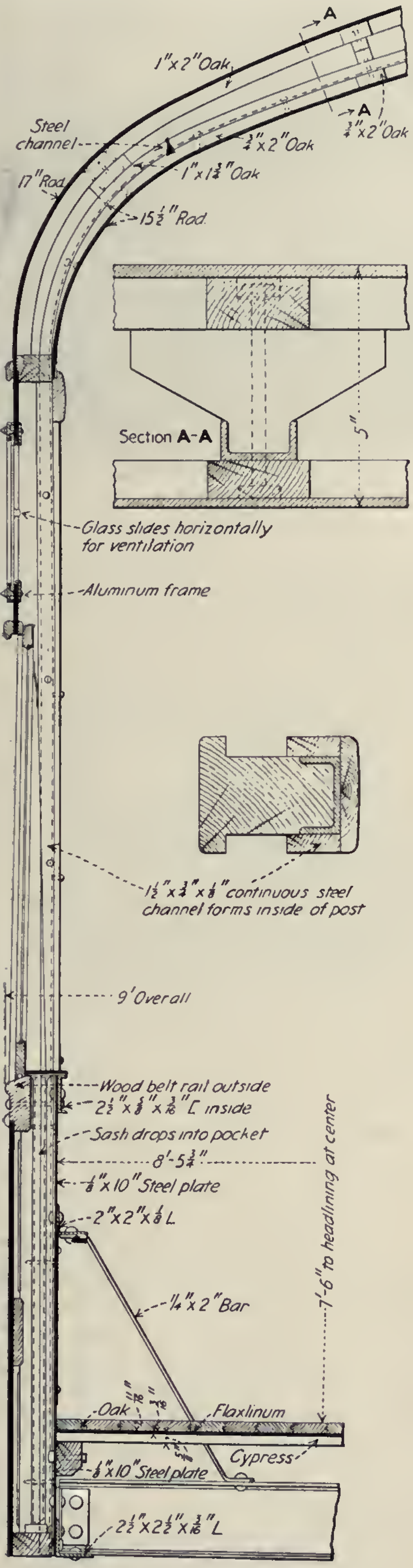
The underframe structure also presents an interesting feature in that the cross-sills are set at relatively infrequent intervals compared with general practice, and a pair of double channel center sills are run the length of the car to support the ⅝-in. lower cypress floor which is laid crosswise and upon which a layer of 3/16-in. insulating material and then an 11/16-in. tongue and groove oak floor is laid longitudinally. An accompanying illustration shows details of the underframe structure.

NEW STRUCTURES COMMON TO INTERURBAN AND CITY CARS

Progress in light-weight interurban car design has resulted in the employment of a number of different types of construction. Although there is nothing about these newer designs which inherently limit them to use in interurban service, they were originally developed for that use. Application of these same general designs to city cars has already been made successfully in a number of instances. This applies particularly to the curved side development which was described in detail as applied to single-truck city cars, and which with some slight modifications has also been incorporated in both light-weight double-truck interurban and city equipment.



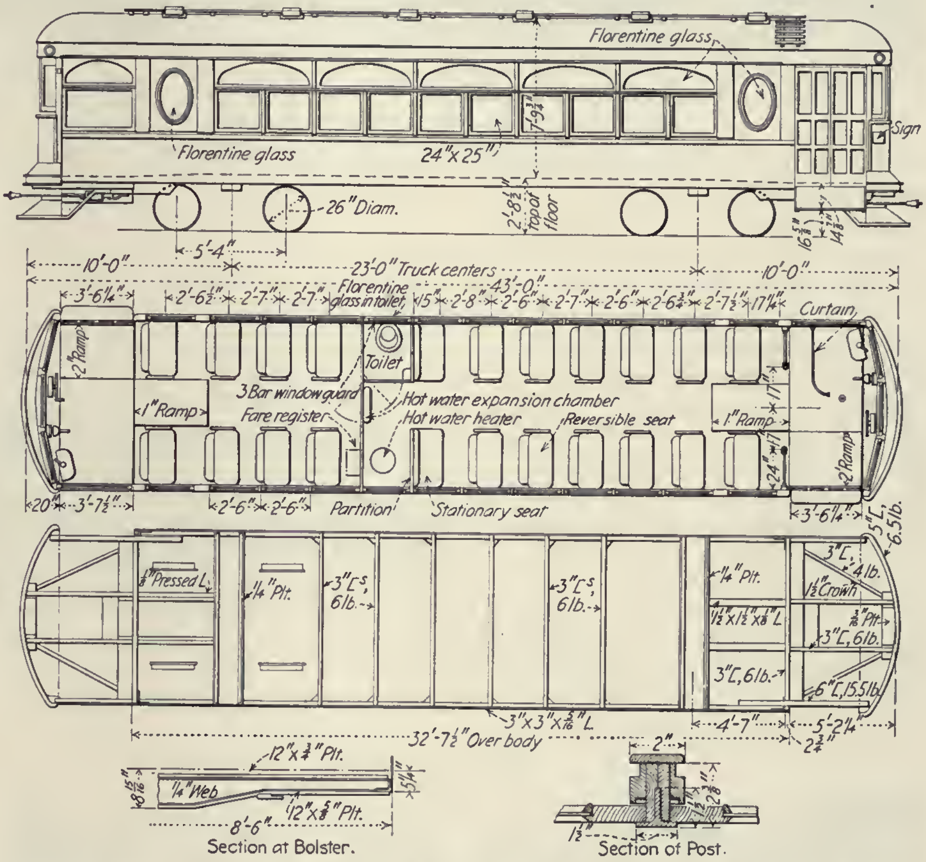
The Steel Framing of the Minneapolis Light-Weight Cars Is of a Trassed Type, with the Steel Members on the Inside of Car



Cross-Section of Minneapolis Car Shows Channel Side Post Construction

In the study of these designs, an outstanding structural practice which seems to be rapidly gaining favor, and which is applicable to the construction of both curved side and straight side cars, is that of carrying an independent self-suporting roof structure upon four substantial corner piers. These are further reinforced by carrying a continuous post structure of either channel or angle section across the car continuously from side sill to side sill at either the bolsters or end sills.

The side window posts are then made of either light wood or pressed-steel members carried between the letterboard and the belt rail, and acting primarily only as guides for the window sash. From the corner piers a vestibule top plate firmly anchored to the piers is carried out to the vestibule corner posts and assists the side knees in the support of the platform.



Side Elevation, Floor Plan and Framing of Eastern Wisconsin Light-Weight Interurban Car Show New Arrangement with T-Side Post Construction

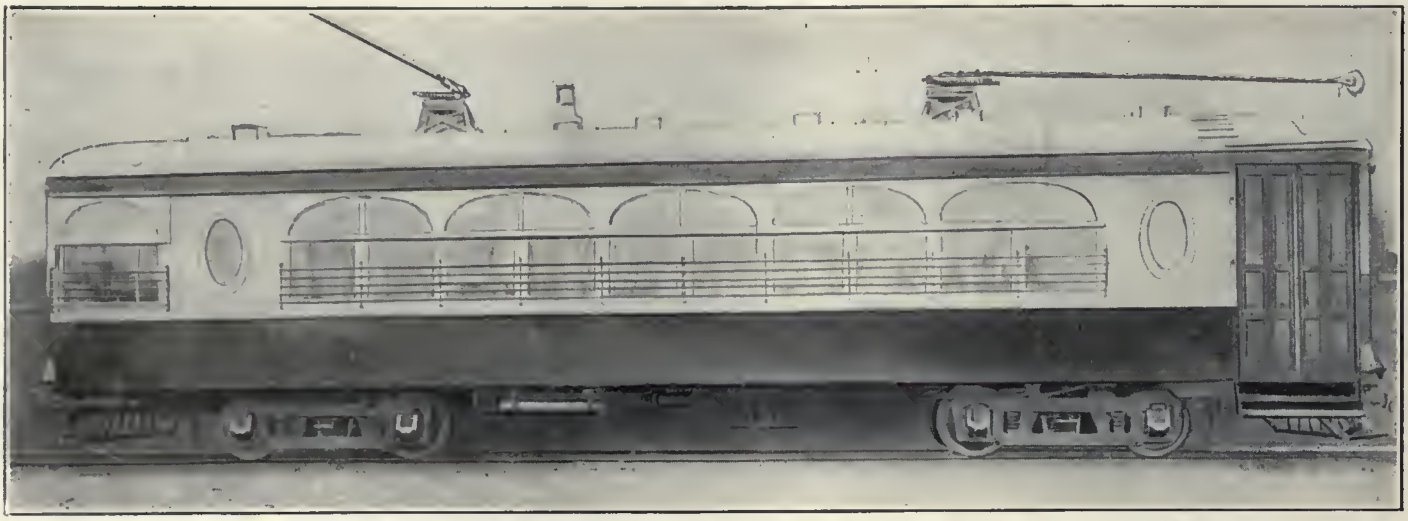
With the type of construction described, the roof is usually built as a unit structure and is set on top of the four corner piers and properly fastened in place. Applications of this type of construction are illustrated in accompanying pictures of car frames that are built along these lines.

An application of the corner panel type of construction to a straight side, light interurban car built for the Eastern Wisconsin Electric Company is also shown in an accompanying picture.

The light-weight interurban cars of the Youngstown & Suburban Railway are built with the corner pier design and a very unusual type of side frame construction. Short T-shaped ribs extending between the sill and the belt rail are curved into a slightly convex form. A paneling material $\frac{5}{16}$ in. thick, made up of a plywood core with a very thin layer of steel applied to both sides with waterproof glue, is then riveted in place to the outside of the framing members with hot rivets applied through steel battens on the outside of the panels. The side posts are then formed of very light, deep, sheet metal channels riveted to the belt rail and letterboard. An accompanying view of the assembled steel frame illustrates the type of construction used.

DEVELOPMENTS IN THE USE OF BETTER MATERIALS

The construction methods described in the forgoing matter have included primarily those outstanding features which have been adopted by various properties in building new equipment. In addition a great many experimental studies are being made for the purpose of determining the possibilities of using new materials. The study of new materials and of new applications for old materials is after all one of the primary functions of the car designer. Reduced weight without impaired strength, freedom from corrosion and min-



Side View of Eastern Wisconsin Electric Company Light-Weight Interurban Car Shows Appearance of Straight Side with Wide Corner Panels

imum maintenance are objectives well worth striving for.

Monel metal and various forms of non-corrosive steel are being tried for various purposes. In addition to making light pressed sheet metal sections more suitable for car structural elements, the use of this class of material for outside finish on cars prevents deterioration. It is being tried on an experimental car in Dayton as a side sheet material to save paint costs and improve the appearance of the car.

Non-corrosive steels have been recently receiving a considerable amount of attention. There are a number of products available in which the non-corrosive qualities of pure iron are utilized. Although such materials are generally slightly inferior for structural purposes, they have a wide field of application for such car parts as dash iron, moldings, post caps, anti-slip treads, splash guards, etc.

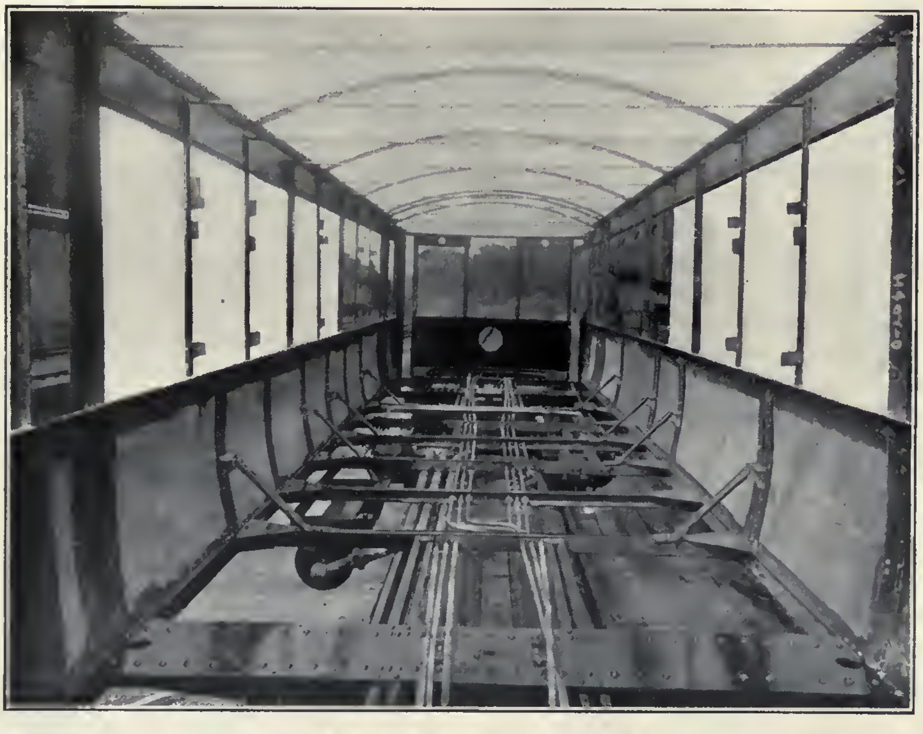
The use of copper-bearing steel has been studied by some engineers for car purposes and some of the steam railroads have conducted exhaustive tests to determine its advantages. There does not seem to be a general agreement as to the advantages of the copper content. In some instances it has been reported that the results obtained with such material were not an improvement, from the standpoint of corrosion, over the ordinary grades of commercial steels. Some engineers have held that the copper content actually increases the rate of corrosion due to the local galvanic action which is said to occur between the two metals.

"Stainless" steel, although quite high in cost, has been considered in connection with car construction. It would seem that for such parts as pressed steel posts, and even for letterboards of light section and in some cases for side sheets, it may have a possible field of application.

Aluminum in its various forms and alloys is rapidly becoming an important material in car construction. Its use for stanchions and grab handles has become fairly common. For this purpose it may be obtained in the form of a hard drawn alloy which is quite rigid. For electrical conduit, where it has been applied to a considerable degree, it may be obtained in an annealed form.

Two difficulties have been encountered with the use of aluminum. For long unsupported stanchions it is found that the 1-in. size is not quite stiff enough for the service and consequently it is usually better practice to use 1¼-in. pipe size for this purpose. It is also found that although aluminum retains a fairly good finish after continuous use and eliminates the necessity for painting stanchions and railings, it does tend to blacken the hand of a passenger. By careful cleaning after installation, this difficulty can, to a certain degree at least, be overcome.

At least one entire installation of aluminum air pipe has been made. On a sample car built in Chicago, all the piping installed was of this material. There was some difficulty experienced in cutting threads and it was also found difficult to pull the

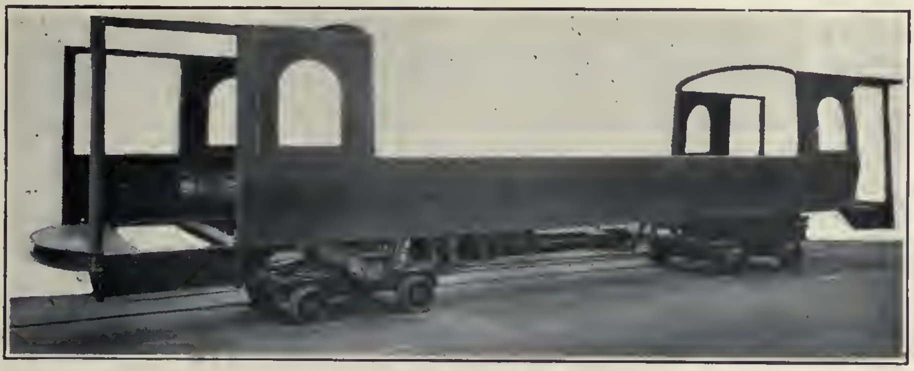


Steel Frame on Youngstown & Suburban Cars. Roof Is Carried on Corner Panels. Steel-Covered Plywood Side Sheets Are Riveted Through Battens on Outside pipe up tight enough to hold the air, without frequently breaking the pipe off at the threads. Some trouble was anticipated due to the effects of vibration, but so far, after nearly two years of service, no serious difficulty has developed. Precautions were taken to prevent corrosion due to local galvanic action, where the pipe enters steel or iron fittings, by painting the threads with heavy insulating varnish instead of the customary pipe fitting compounds.

There is a wide field for the application of aluminum in other forms. Both in the form of castings and of rolled sheets its alloys have been successfully heat-treated to give really surprising physical properties. In the form of an alloy known as "Duralumin," rolled sheet aluminum is available in heat-treated form and it develops a tensile strength of 50,000 to 60,000 lb. per square inch, which is ample for many car structural requirements. The material in this form is an alloy of copper, magnesium, manganese and aluminum, containing approximately 3 to 4½ per cent copper, 0.4 to 1 per cent magnesium, 0 to 0.7 per cent manganese and the balance aluminum, with some slight traces of iron and silicon in the form of impurities. There is no question but that the ultimate production of this class of material in the form of heat-treated rolled sections will have a considerable application for car structural purposes.

Aluminum in a considerable range of alloys is available for castings, and these are being applied quite generally and to a constantly increasing extent for car body construction. The castings may be heat treated, and in that form develop physical properties which enable this material to be substituted for brass and in some cases even malleable iron, for many purposes at considerable saving in weight. When produced in permanent molds, heat treated and polished, aluminum takes a brilliant and permanent polish. It has been utilized to a wide extent for automobile hardware and is receiving a considerable amount of attention and study in connection with similar uses in street car body construction.

Seat frames, heater cases, grab handle sockets, door engine castings, motor junction boxes and many other parts have been successfully made of this material in either sheet or cast form. On a recent lot of cars in Chicago, the controller frames and tops were made of aluminum at a saving of 150 lb. per car and no increase in cost. On the recent lot of single-truck safety cars built for the Kentucky Traction & Terminal Company aluminum step castings and operating arms were applied.


Curved Side Steel Frame Assembly Shows Construction of Corner Piers with Steel Channel Vestibule Top Plate

Some difficulty has been experienced in machining aluminum and it is difficult to tap holes. Also, for door engine castings or other parts that are required to hold air pressure some trouble from porousness is sometimes encountered. This, however, is largely a matter of using proper alloys and getting correct foundry practice.

Aluminum pipe and conduit fittings are now available and several of the large conduit fittings manufacturers can supply almost any of their products in this material. Interior enameled aluminum tubing has been approved by the underwriters for conduit work and has been applied to a considerable extent for this purpose. The Chicago Surface Lines has installed 1½-in. aluminum pipe on recent cars to carry motor control cables under trapdoors. The material seems to be entirely satisfactory for the purpose.

Application of aluminum as a side sheet material has been made to a considerable extent in bus body construction, but there is a limitation to its use for street car bodies due to the difficulty of properly fastening it to a steel frame. The use of hot rivets is desirable from the standpoint of securing a permanent and rigid structure, but the danger of corrosion and difficulty in fabrication make this form of construction undesirable. With a type of framing similar to that described for the Minneapolis sample train construction, in which the outside panels are fastened to wood, aluminum side sheets could probably be used.

The developments in plywood and in plywood with steel or some other similar material on the outside open up a wide field of possible applications. This material was first developed during the war in connection with airplane fusilage construction, and depends for its success as a structural material on the use of a waterproof glue. As a roof material it is very substantial, and in ¼-in. thickness for this purpose is considerably stronger than the customary ⅜-in. poplar tongue and groove sheeting material. As side lining or as the plate of a girder, it forms a very stiff and rigid structure. For car roofs it has been applied in the form of large panel sections. In the case of a sample single-truck car built in Chicago it was scarfed and glued in one continuous panel.

One limitation in the use of plywood, or of plywood faced with steel, is the difficulty of fastening it successfully to a steel frame. On the light-weight interurban cars built for the Youngstown & Suburban Railway this material was formed to the shape of the curved side structure and was then fastened to the steel framing with hot rivets. In order to accomplish this, however, it was necessary to apply steel battens on the outside to form a support for rivet heads. This presents a rather unsatisfactory fabrication problem and has limited the more general use of plywood material. The development of more satisfactory methods of application in car construction would undoubtedly open up a much wider field for its utilization.

The constantly widening supply of materials opens many opportunities for future development of car construction. Reduced weight with increased strength and simplified construction with decreased cost are being obtained as more and more applications for new materials are found almost daily.

Advances in
Car Lighting, Heating and Ventilating

Look to the Comfort that the Passenger Senses

The trend of lighting practice and experience as to what makes for good and bad lighting. The advantages and disadvantages of various lighting systems. Heating development discussion gives details of some altogether new designs of both hot air and electric heating equipment and tells why future equipment will place the heaters in the floor. The treatment of the problem of ventilation shows how the psychological requirements may be met in arch roof cars. Recent improvements in heater control to conserve energy consumption are also noted

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THERE are few factors connected with the subject of car design that have a more direct effect on the comfort of passengers than the performance of the lighting, heating and ventilating equipment. There are also few elements in the design which are called upon to give satisfaction under a wider range of conditions, or where the performance of the apparatus is more difficult to control. The provision of attractive and satisfactory illumination in a moving and vibrating car structure with low headroom is a subject which requires careful study and intelligent treatment. The combined requirements of keeping passengers comfortable in cold weather over long rides on interurban cars or on city cars where doors are being opened frequently, and at the same time providing satisfactory ventilation for the cosmopolitan multitudes who are handled by city transportation systems, constitute a situation which taxes the ingenuity of the car designer.

Both operators and manufacturers have been and are very much alive to the situation and to the possibilities which it presents from the standpoint of improving the service and providing for greater passenger comfort.

DEVELOPMENT IN LIGHTING EQUIPMENT

The greatest single step in obtaining better car illumination which has been made since the invention of the incandescent lamp has been the development of the tungsten filament to a point where it is suitable for operation under the condition of extreme vibration encountered on a moving car. Developments of units in larger sizes, and the design of reflectors and suitable holders for street car service conditions, have made possible the more scientific applications of the already highly efficient tungsten lamp. Recently completed tests have demonstrated that still further progress may be expected in the immediate future. The application of large capacity units of nitrogen-filled tungsten lamps to railway car requirements, which has in the past presented several outstanding difficulties, may in the near future be expected.

Holders Designed to Prevent Shades Dropping Out

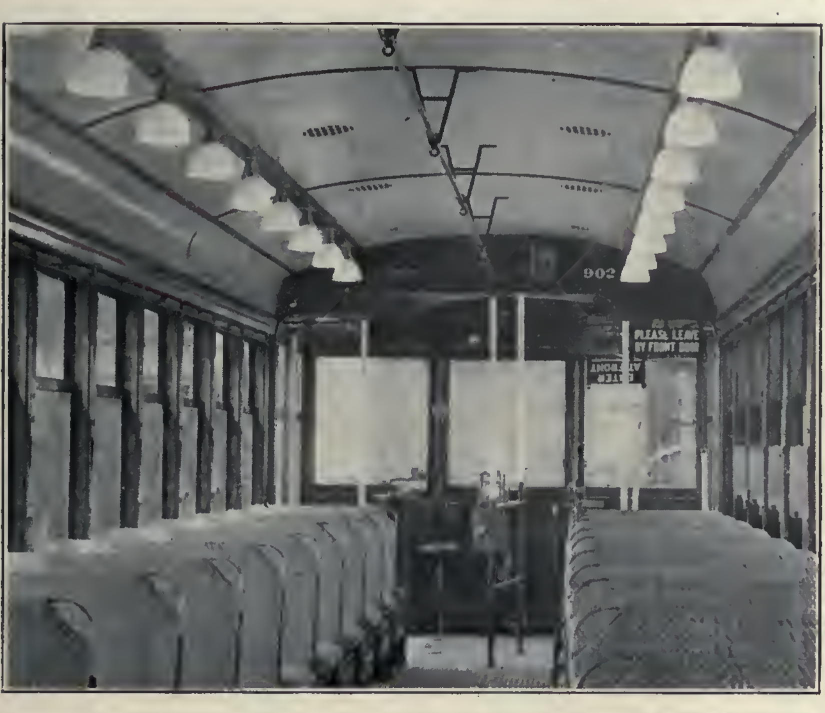
The work of developing proper installations for car lighting has been carried on by many railway properties. In Cleveland this subject received very careful attention and study, which resulted in the adoption of the center lighting arrangement with large units and opal-type glass reflectors.

In Chicago and many other cities investigation of the effect of headlining colors on the general illumination produced with a given lamp installation resulted in the change some years ago of the headlining color from a comparatively dark shade of green to a light shade of buff. It was found that an approximate increase in illumination at the reading plane of 40 per cent resulted from this change in color. Likewise on many other properties study of the subject has resulted in the adoption of modern illuminating installations.

One of the important activities which have led to improvements in car illumination has been the development by several manufacturers of types of glass shades and holders which are suitable to car operating conditions and which can be relied upon from the standpoint of passenger safety and maintenance cost.

In the search for proper illuminating installations on street cars it was realized early that illumination design involved an appreciation of certain fundamental principles.

One of the most important of these is that intensity is not the sole measure of proper lighting. Modern installations are designed to eliminate the uncomfortable effect of a direct or reflected glare in the eyes of the passenger. At the same time the designer has had in mind the merchandising and sales value of brightly illuminated cars. That there is an attractiveness and advertising value in bright illumination has been well recognized by most operators and there has therefore not been a tendency to cut down the amount of illumination provided to the minimum generally considered as fair illuminating intensity from the standpoint of vision. The economies made possible by the development of more efficient lighting equipment have in general been put into obtaining the merchandising advantages of cars that are better and more brightly illuminated.



Left—Example of Side Lighting with Small Lamps and Deep Shades in Cars of San Francisco-Oakland Terminal Railway. Note Close Spacing of Lamps. Right—Combined Lighting and Ventilating Fixture Used in Cincinnati.

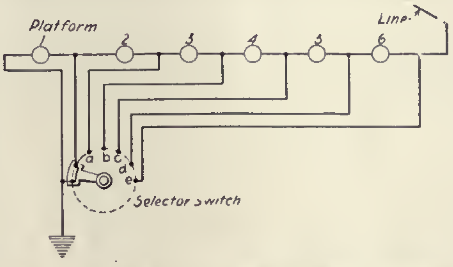
In the selection of a given type of illuminating installation a number of considerations are encountered and it may therefore be of interest to summarize here briefly some of the principles and factors which have been considered and developed by those properties which have been in a position to study the problem.

Elements to Be Considered in Lighting Design

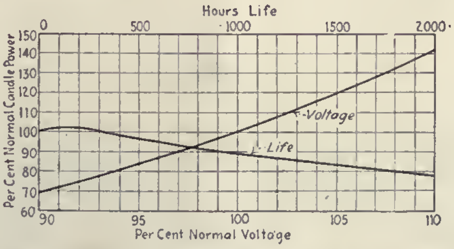
The elements to be considered in the design of a car lighting installation may be listed as follows:

Intensity of illumination at the reading plane; direct glare, reflected glare, shadows; favorable appearance of the car interior; maintenance.

The degree of illumination provided by any installation must at least be such that newspapers or other printed matter may be read without undue eye strain under the difficult conditions encountered on a moving car. A value of between 4 and 5 foot-candles has been generally taken to represent good practice.



Wiring Diagram for Single-Circuit Lighting with Extra Lamp and Selector Switch



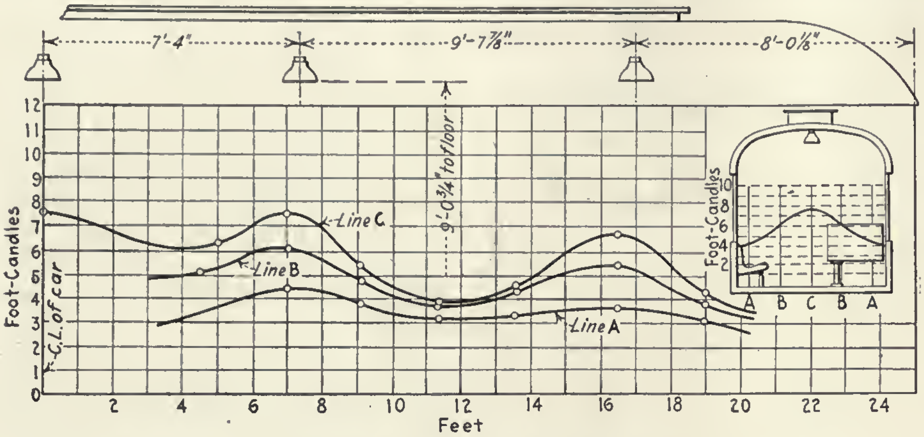
Candle-Power Regulation and Performance Curves for Mazda "B" Street Railway Lamps

The most frequent cause of bad lighting in cars is the presence of direct glare. Because of the limited height available, as compared with the ordinary room, the brilliantly lighted lamps in a car are within the direct line of vision of the great majority of passengers. The general effect of glare may also be obtained even where glass reflectors or shades are installed, as the result of too great a contrast between the bright light source and a comparatively dark background or headlining.

Uncomfortable results may be obtained from reflected glare when improper types of reflectors are used over the lamps. The eyes are especially sensitive to light rays from below. Reflectors which do not properly diffuse the beams of light allow them to strike the reading surface in such a manner that they are reflected back into the eyes of the passenger. A brilliantly polished or shiny headlining will also sometimes give the bad effect of reflected glare.

The lighting installation must provide for the elimination of shadows. This applies not only to shadows cast by the body of a seated passenger, but also to the elimination of shadows from passengers standing in the aisle. Too great a spacing of large light units installed along the center line of the car is the most frequent cause of this defect.

The importance of obtaining a pleasing appearance of the car interior requires the avoidance of any form of opaque reflector. In addition, the combination with a proper lighting installation of suitable colors for both the car walls and headlining is necessary in order to obtain the best results.



Light Distribution Curves for 94-Watt Mazda Lamps in Cleveland Car Show Variations in Illumination

The vibration encountered on a moving car makes the item of maintenance cost of illuminating equipment one to be carefully considered. It is this factor which has been the primary deterrent from obtaining general adoption of modern lighting installations. Not only is the question of breakage and renewal of lamps and reflectors involved, but also the element of cleaning cost becomes of importance in connection with the use of any form of glass shade. The increased liability of personal injury from the use of defective shades or holders is also an important item to be considered. It is suggested that the art of car lighting has now developed to the point where further experimenting might well be done with indirect lighting equipment with the lamps and reflectors concealed along the two sides of the headlining. The fact that the light pockets collect dust should not deter us from getting the fine effect possible, when this drawback is so easily corrected.

The various types of lighting installations in use may be roughly divided into two general classes, namely, center lighting or side lighting. In some cases a combination of these two methods has been used as designers have sought to obtain better light distribution and the elimination of shadows.

Center lighting has the advantage of simplicity in wiring and reduced installation cost. By the use of proper reflector equipment and the avoidance of too large a spacing between lamps, it has given very satisfactory results from the standpoint of lighting intensity and distribution. This system lends itself readily to the use of large lamp units with reflectors. By the use of such large units the number of outlets is reduced, adding further to the saving from simplified wiring.

There are other advantages in favor of this plan. One of the most costly items connected with car lighting maintenance is the factor of stolen lamps, and although various forms of lock sockets have been designed and applied with varying degrees of success, the use of larger lamp units largely eliminates this difficulty. This is due to the fact that the large units are not so readily applicable to other uses. The number of lamps to be handled and the consequent loss from breakage also should be less with large lamps. This is further influenced by the heavier and more rugged filament in the larger lamp.

From the standpoint of the desirability of shades or reflectors for obtaining pleasing effects, the large units have an additional advantage. Since the cost of shades and holders is a material item an installation which reduces the number required is a desirable arrangement. This advantage also applies relative to the maintenance and cleaning of shades.

There are, however, certain disadvantages connected with the use of large lighting units spaced down the center of the car. In order to provide auxiliary lighting for signs, headlights, doors and vestibules where large unit lamps are not necessary, one or more circuits of small lamps must be used. This immediately introduces two different sizes of lamps to be carried in stock. The larger lamps are also considerably higher in cost per unit, and carelessness in handling at carhouses soon causes their use to be very expensive.

Still another disadvantage in the use of large units is that the failure of one lamp, by putting out the circuit, leaves all or a large part of the car body in darkness. This possibility is usually provided for by the installation of an auxiliary lamp which normally is not used, but which can be thrown into the circuit by means of a selector switch to replace the burned out lamp. The selector switch is arranged so that the auxiliary lamp is quickly shunted around the defective one by turning the handle of the switch from contact to contact until the defective unit is located.

The necessity for such a switch adds considerable wiring and nullifies to a certain extent at least the simplification in wiring obtained by spacing the lights down the

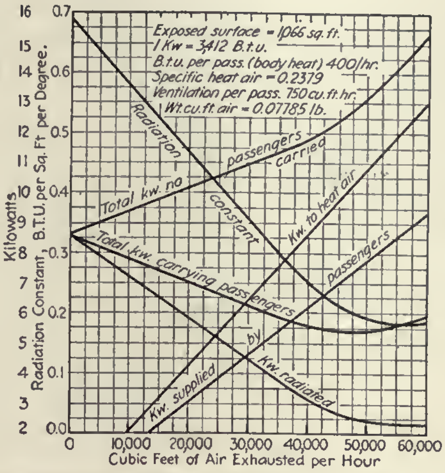
Left—Arrangement of Air Intake Ducts Around Heaters as Used in Chicago. Right—Ceiling Fan in New York Subway Cars Help to Solve Difficult Ventilating Problem center of the car. The auxiliary lamp also represents a large extra unit to be carried in the car, and requires that defective lamps be promptly replaced through frequent inspection or careful reporting by train crews to avoid the entire car being left in darkness when a second lamp fails. The failure of two lamps in any trip will leave the car in darkness even when care is exercised in replacing promptly all defective lamps. When a number of circuits of smaller units are used this difficulty is avoided by arranging the circuits so that failure of one lamp still leaves fair illumination.

Each system therefore has its advantages and disadvantages, but the requirement of affording comfort to passengers by the provision of proper shades or reflectors tends to favor the larger-unit, center-lighting arrangement. The tendency seems to be toward the adoption of this form of installation on a large proportion of the recently constructed cars where reflectors are installed.

HEATING AND VENTILATING

Recent progress in the design of heating and ventilating installations and in the development of apparatus by manufacturers has been largely due to a gradual awakening of the industry to an appreciation of the fundamental principles involved in meeting the perplexing combination of conditions and the apparently opposing requirements presented by the general problem. By careful study and experiment the factors which have the greatest direct bearing upon passenger comfort have been determined, and apparatus has been developed for controlling these factors and for properly co-ordinating the operation of the heating and ventilating installations.

It has been found that although the temperature within the car is a general measure of the total amount of heat supplied and the CO_2 content of the air is a measure of the total quantity of air supplied, the temperature within the car body is not an accurate measure of the comfort provided for the passenger by the heating system, nor is the CO_2 content an accurate measure of the actual effect produced by the ventilating system. Experience has demonstrated that the provision of much less heat in the proper manner and the interchange of much smaller volumes of air, but with equipment arranged with more attention to the effects produced, will give eminently more satisfactory results.



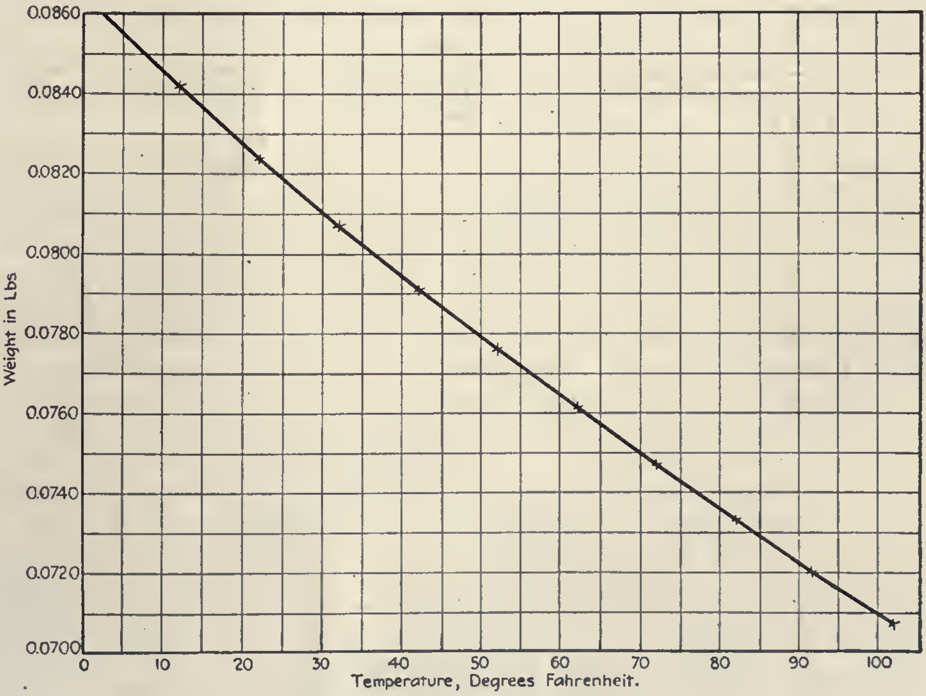
Curves for Heating Calculations, Based on Supplying 750 Cu.Ft. of Air per Hour to Each Passenger in a Car

PROGRESS IN VENTILATION

The primary disadvantage in the arch roof type of car construction which has probably had the greatest effect in retarding its rapid universal adoption has been the psychological effect of the arch roof on the passenger's judgment of the effectiveness of the ventilation. The arch roof with a comparatively low ceiling height produces an impression of "stuffiness" regardless of what the actual air conditions may be. A comparatively high car temperature tends to increase this effect, while a lowering of the temperature tends to decrease it.

Study and experiment have demonstrated that it is the introduction of small quantities of fresh air, or rather cool air, in such a way that it strikes the faces of passengers, that gives the impression of good ventilation in monitor deck cars. It has further been demonstrated that it is the lack of this cold air which generally produces the unfavorable impression of the ventilation in arch roof cars, even when the actual air condition measured in terms of CO_2 content may be much better than in a monitor deck car where the ventilation would be judged good.

Several ingenious and effective devices and construction methods have been introduced during recent years to overcome this unfavorable result of arch roof construction. A compensating type intake, similar in appearance to the other ventilators which are used for exhausting air through the roof, is so arranged that by means of a movable vane provided in the ventilator an automatic adjustment for car speed is made so that an approximately fixed volume of outdoor air is allowed to enter the car near the front end regardless of the speed. This cold air is then deflected as it enters, so that it spreads back and diffuses under the headlining and gradually reaches the breathing zone and the faces of passengers. In this way the stimulating effect of cool air directly in contact with the face produces the effect of good ventilation, and the compensating feature of this device prevents obtaining unpleasant chilling draughts at high car speed.

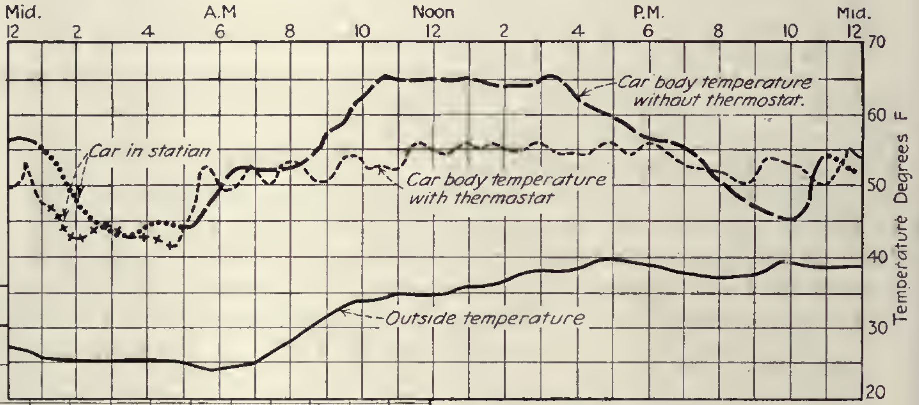
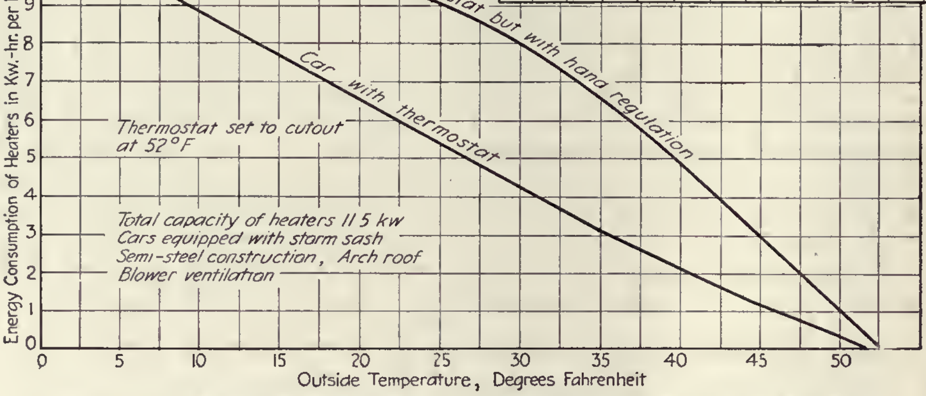


Curve for Determining Weight of Dry Air at Various Temperatures

Several arrangements have been devised for providing small movable sash in the arch roof car which give the same results as are obtained in the monitor deck construction. One of the more common forms of construction is to arrange the top side sash so that it is hinged at the bottom and can be tilted in at the top through a small angle, to form a ventilating opening. Side guards are provided at either end of this tilting sash to deflect the incoming air upward and prevent objectionable direct draughts.

Another method which is represented by the type of construction adopted on the light-weight sample train built in Minneapolis, is to carry the top sash practically to the roof line, eliminating the customary letterboard. The top sash glass is arranged so that it will slide horizontally for a short distance to provide a ventilating opening.

All of these devices accomplish the general result of allowing small quantities of cool air to enter the car directly. They produce generally the same effect that is obtained from the deck sash construction on monitor deck cars. It is probable that a still further extension of the lighter weight arch roof construction will result from a further development and perfection of these recent ventilating improvements.

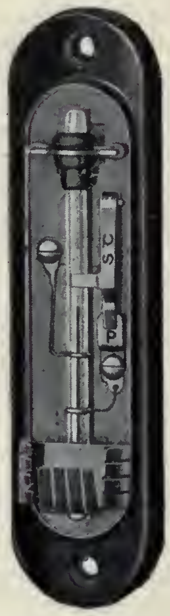



Below—Test Results Showing Effect of Thermostat on Energy Consumption. Above—Graphic Test Record Showing Effect of Thermostat in Regulating Car Temperatures

The difficulty with the original ventilating systems which were installed was that such systems were designed for the purpose of producing relatively large interchanges of air, and of combining the ventilating system with the heating system so that the "fresh" air would be heated before coming in contact with the passenger's body. The most extensively used systems operating on this principle are the "vacuum" type and the "blower" type.

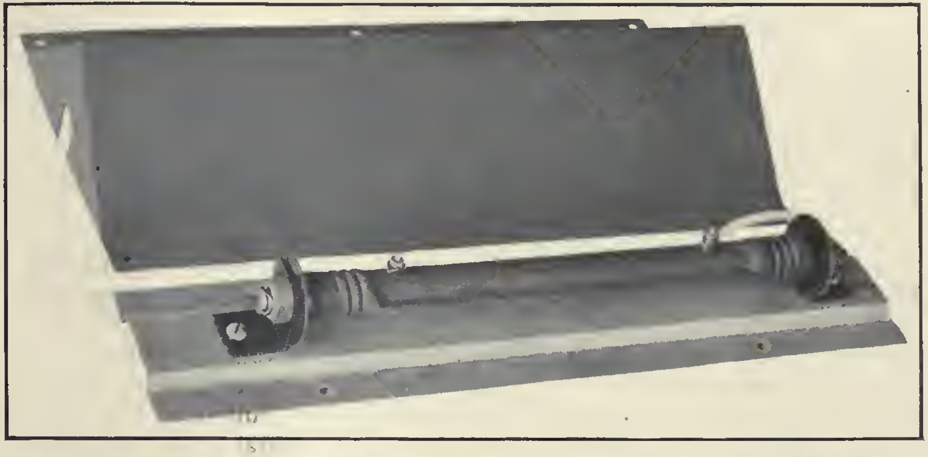
In the vacuum system an air duct is arranged between the car headlining and the roof, opening through registers to the interior of the car body. A blower fan mounted under one hood and inclosed in an appropriate housing is designed to draw air from the end of the duct and exhaust it through louvers provided in the vestibule hood. Outside air was at first drawn into the body through holes located in the car floor. This arrangement was quickly demonstrated to be very unsatisfactory due to the large amount of dust which was drawn into the car. As a result of this experience, and still with the idea in mind that the large quantities of incoming air should be preheated, some cars were constructed with intake louvers in the side girder, which opened into carefully constructed sheet metal housings entirely inclosing the electric heaters. Careful tests have demonstrated that with any such fan system or with the "aspirator" type of exhaust ventilators, there is usually ample provision for air intake around doors and sash, even with storm sash in place. Under the conditions encountered on high speed interurban cars, the provision of special intakes may in some cases be necessary to obtain proper distribution.

The usual blower arrangement is a combined system for heating and ventilating, in which the blower is not only utilized for producing a circulation of air, but is also used to distribute the heat from a coal fired or electric heating unit located at some one point in the car. In such an installation the ventilation is provided incidental to the matter of getting proper heat distribution throughout the car.



Modern Type of Car Thermostat with Flexible Mounting and Spring Contact to Cut Off Heat if the Thermometer Is Broken

An outstanding difficulty in providing satisfactory ventilation in a car is that the condition of the air is largely judged by the passengers through the sense of smell. The odors resulting from a large number of people in a comparatively limited inclosure tend to produce, through the unpleasant effect on the sense of smell, a mental predisposition to judge the air "stuffy." This is particularly true when the air is not maintained in a sufficient state of motion so that this fact is definitely felt by the passengers. This is one of the most difficult factors to handle in connection with car ventilation. The presence for a comparatively short period of a few passengers who have partaken of garlic, for example, or who represent members



A New Type of Inclosed Heating Element Is Made of a Helical Wire Coil Inserted in an Insulating Tube and Then Tightly Compressed in a Metal Covering. It Has Been Provided with a Light Rugged Case Designed for Mounting on the Car Floor

of that portion of our population who are said to receive a bath twice during their lives, namely, at birth and at death, will quickly put the car atmosphere in a very uncomfortable condition for succeeding passengers, regardless of how low its CO_2 or bacteria content may be.

In addition to the methods which are used for the purpose of obtaining air dilution and interchange, it would seem, on consideration of this phase of the matter, that railway operators might also find certain applications for some of the various devices that have been developed to overcome unpleasant odors in buildings, under conditions where the congregation of large numbers of people in one inclosure makes it otherwise impossible to prevent a "stuffy" sensation by the mere supply of large quantities of outside air. The use of some form of deodorizer or perfumer seems to be at least worthy of experiment in connection with this difficult problem in car ventilation.

The human body is at all times radiating heat and giving off moisture through the skin, and unless the combination of temperature and humidity of the air in any inclosed space is such as to allow the maintenance of a normal rate of evaporation and radiation, a feeling of discomfort will result. Where other methods in themselves will not produce the desired result, or where particularly difficult conditions make it impossible otherwise to provide effective ventilation, it is possible by simply agitating the air contained in a car with a fan greatly to improve the situation. In this case the agitated air, coming in contact with the skin, more rapidly absorbs bodily heat and moisture than when it is stationary.

A very good example of the installation of fans for ventilation is that in the New York subways. Although the combination of conditions encountered there is particularly difficult to handle, and while the ventilation results that are obtained may not be held up as an example of the ideal, there is no question but that the simple expedient of installing these fans has very greatly helped matters.

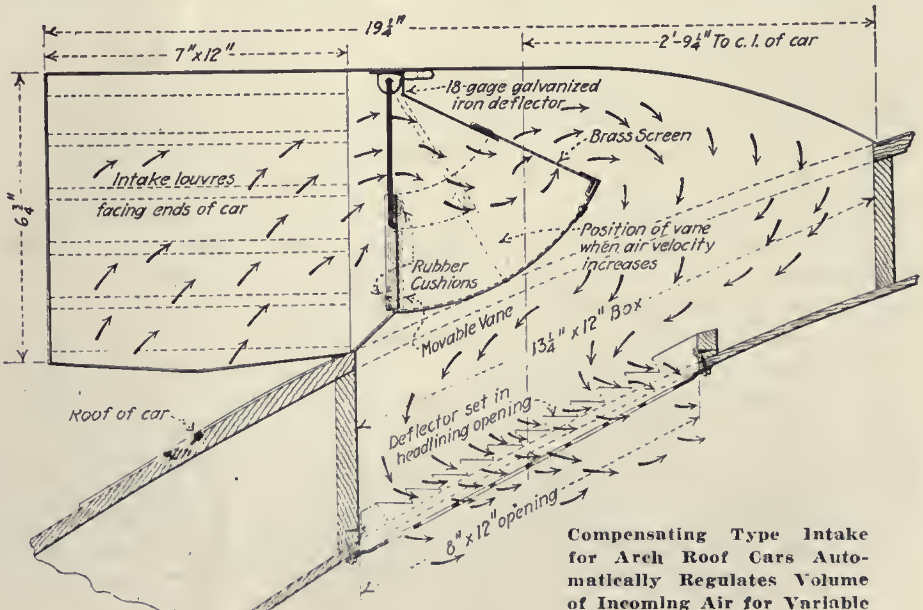
Under certain conditions encountered on heavily loaded city surface cars a modification of this arrangement, consisting of several small, comparatively low speed fans, set up into recesses in the headlining for use during extreme rush hour conditions, might give more satisfactory results at less cost of installation than some of the more elaborate blower systems which have been used in the past. With this form of installation the required air interchange could be provided with existing types of natural exhaust ventilators, and the auxilliary fans would be used only when the car was heavily loaded.

It may be profitable to summarize here the primary function which must be performed by a proper ventilating system, from the standpoint of adequately providing for passenger comfort. The system must maintain the air within the car in a sufficient state of motion to insure proper radiation of bodily heat and moisture. Its efficacy may be increased by the introduction of small quantities of cool air in such a manner that the invigorating effect of such air in contact with the skin of the face will be produced, without the volume becoming so great as to produce "chilling" of the entire body. A sufficient rate of air interchange and dilution within the car must be provided to carry off the objectionable odors resulting from a large number of people in a comparatively small space that is entirely inclosed.

THE SELECTION AND INSTALLATION OF CAR-HEATING SYSTEMS

Just as the problems of ventilation may be said to be physical rather than chemical, so also may the problem of heating be said to be as much a matter of proper distribution and control as of the maintenance of high enough temperatures. Modern practices and apparatus show a gratifying recognition of the importance of control, but there is still a great deal of work to be done in connection with the matter of proper distribution.

The type of heater used by various

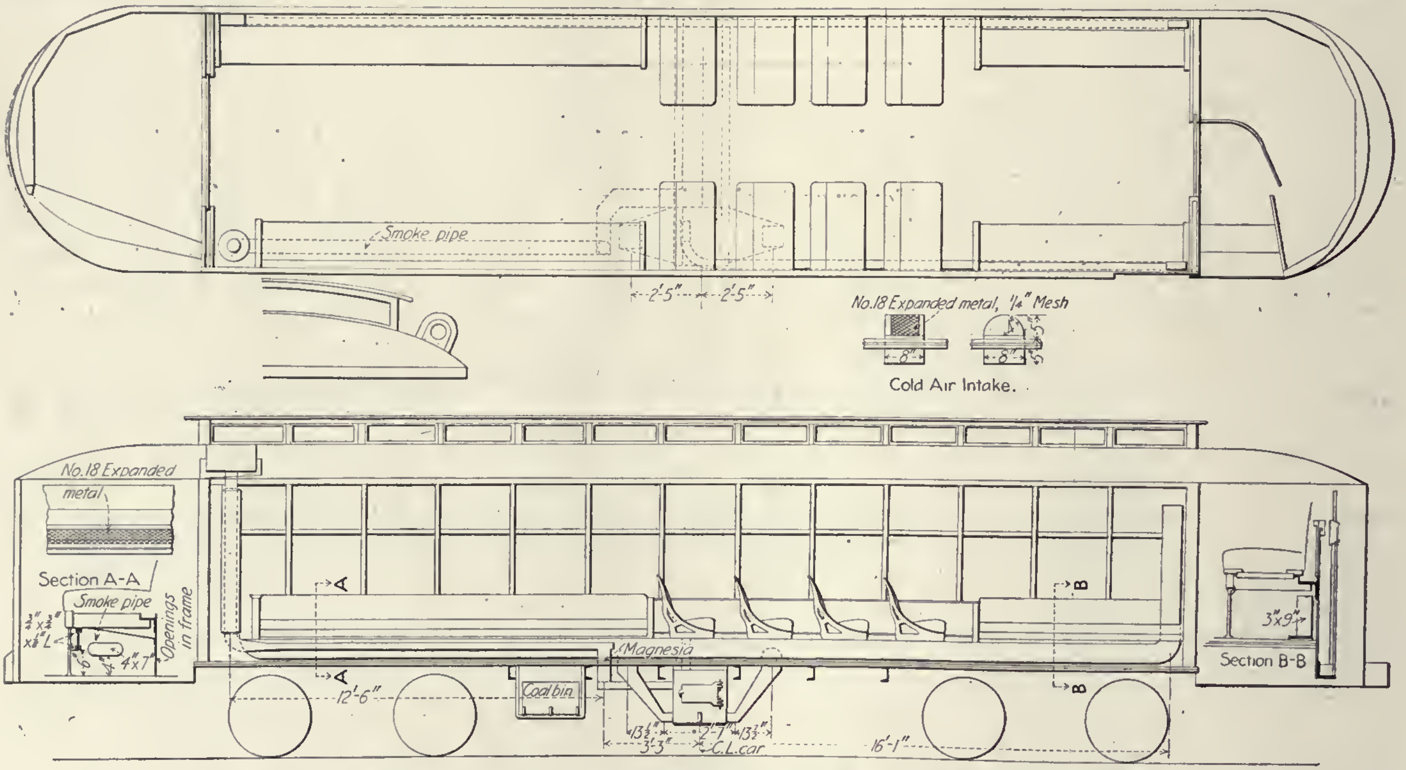

19¼"
7"x12"
2'-9¼" To c. l. of car
6¾"
18-gage galvanized iron deflector
Brass Screen
Intake louvres facing ends of car
Position of vane when air velocity increases
Rubber Cushions
Movable Vane
13¼" x 12" Box
Roof of car
Deflector set in headlining opening
8"x12" opening

Compensating Type Intake for Arch Roof Cars Automatically Regulates Volume of Incoming Air for Variable Car Speeds properties is determined largely by the conditions existing on the individual property, consideration of first cost as well as maintenance and operating costs, the type of service in which the car is used, and the climatic conditions existing in the district in which the property is located. The relative advantages of coal and electric heat are largely determined by these conditions. A northern location in which long and severe winters are experienced tends to favor the coal heater on the basis of economy. Likewise, limited power supply feeder capacity, or a high cost for electrical energy, tends to favor this type of heater. Electric heaters have the great advantage of cleanliness and freedom from fire risk, together with flexibility of control and ease of regulation as well as freedom from odors or coal gas. In some few instances both coal and electric heaters have been installed with the object of utilizing the coal heater during the periods of extreme temperature so as to avoid adding the maximum electric heater load to that required for power. In other cases, particularly on high speed interurban lines, an installation of both coal and electric heaters has been made for the purpose of utilizing the electric heater during days of moderate temperature and adding the coal heater when the temperature becomes so severe that an excessive capacity would be required in the electric heaters to maintain the car in a comfortable condition.

There have been a number of important developments in the design and manufacture of heating equipment. The increasing availability of high grade resistance wires which allow the construction of inclosed heating elements for operation at comparatively high wire temperatures have resulted in the development of several types of inclosed heater elements. One of the difficulties experienced with this type of element has been to obtain an insulating material which would stand the high temperatures developed on the interior of the unit without deterioration and without the formation of conductive gases which produce destructive short circuits. The advantages of an inclosed type heating element are obvious. The inclosure of the wire within a rigid covering or case gives both better mechanical support and freedom from wire failures due to vibration, and also gives protection of the wire against mechanical injury and corrosion. The possibility of short circuits and grounds due to materials getting into the perforated heater case is also largely reduced with the armored or inclosed type of unit. A recently perfected type of inclosed heater is designed with a helical coil inserted in a porcelain tube and then covered with a metal case which is tightly pressed over the completed assembly.

A NEW DEVELOPMENT IN HOT AIR HEATING

An interesting development in coal heaters has been made in Minneapolis. Here the heater is carried under the floor of the car. With a draft from below the smoke pipe is carried across under the floor and thence back and up, running horizontally under the longitudinal seat at one rear corner of the car in an appropriately protected duct to a vertical pipe leading overhead to a smoke hood on the roof. The heat radiated from the horizontal smoke pipe under the seats is allowed to enter the car through an expanded wire grill set into the front of the seat box. A sheet metal housing surrounds the stove and intakes lead up through the floor and terminate under two cross seats on the same side of the car on which the heater is located. A horizontal duct leads from the housing surrounding the stove up through the floor and along the truss plank to the forward cor-



Coal Heater Developed in Minneapolis Installed Under the Car Floor

Warm air ducts along the truss planks distribute the heated air through the body. Vertical stacks in the front corners of the car body help the circulation and distribution. The smoke travels in a flue, inclosed in an air duct, across under the car and back to a longitudinal smoke pipe located under the side seat and then up through the roof at the rear.

ner of the car, where it rises vertically in the corner to a point just below the headlining. A second duct surrounding the smoke pipe leads from the stove housing across under the floor of the car to a second horizontal duct running the entire length of the car body on the opposite side from the stove. The rear end of this second horizontal duct terminates on the floor near the rear corner of the body and the front end turns up into a vertical stack in the same way as the duct on the opposite side of the car. The chimney action of the two vertical stacks in the front corners and the circulation produced by the heat from the stove causes air which enters at the floor intake under the two cross seats to move forward and up through the vertical stacks from which it then spreads into the car body.

A portion of the air which crosses under the car in the duct previously described also finds its way backward into the rear end of the car. Openings are cut through the car lining under longitudinal seats to the sash pockets which have openings below to the outside, so as to produce both a fresh air supply and a circulation over the hot air ducts to help distribute the heat in the car. Accompanying illustrations show the appearance of the heater under the car and the arrangement of apparatus in and under the body.

This same general arrangement of housing and ducts has also been utilized in an experimental installation in Minneapolis for the purpose of conducting the energy lost in the control rheostat to the car body interior for heating purposes. It would seem that the Minneapolis type of coal heater construction would have material advantages for use in installations on interurbans where it is desired to have an auxiliary coal heater available in connection with the electric heaters as previously mentioned.

REDUCING PEAK LOAD BY CUTTING OFF HEATERS

In connection with the subject of reducing peak power demand where electric heaters are used, an interesting experiment was conducted some years ago in New York and was described in the ELECTRIC RAILWAY JOURNAL of Aug. 17, 1918, on page 292. In this test the thermostat and car controller were interlocked so that the heat would be off when the power was on. Further investigation of the possibilities of such an arrangement might be warranted. A refinement of this idea is suggested on page 438 of the Sept. 22, 1923, issue of the JOURNAL wherein it is proposed to use a relay to cut off the heaters during the accelerating periods.

Since the advent of the self-ventilated motor, there is also available a type of blower and potential heat source to which some attention may profitably be given. It is a well known fact that the effect of dust in poorly ventilated motors is the cause of some limitations in performance. Although the problem of maintaining a flexible duct connection to the car body is not at all a simple one, the possibilities of drawing dust-free air from the car body for motor ventilation and discharging it through ducts built into the car floor or along the truss plank are at least worthy of mention in this age of progressive thought regarding car construction and operation.

Location of the Coal Box and Heater Under the Floor on Minneapolis Cars.

POSSIBILITIES FOR DEVELOPMENT IN ELECTRIC HEATING

After the type of heater to be used has been determined upon, the results which will be obtained may be largely affected by the way in which the heaters are installed. The general use of electric heaters makes possible certain advantages in the location of the heating unit which have not been generally recognized by either car designers or heater manufacturers. The practice has been to mount such heaters either along the truss planks of the car, under longitudinal seats, in longitudinal seat risers or upon the bulkhead or the vestibule dash. In any of these mounting positions no provision is made for warming the floor of the car.

From the standpoint of passenger comfort, here is the opportunity for a desirable development. The availability of inclosed type units and the further opportunity for the construction of entirely inclosed housings for heaters which is possible by virtue of the high grade resistance wire coming into use make it practicable to develop a form of inclosed heater case which can be mounted directly on the car floor under cross seats and in recesses in the floor in front of longitudinal seats so that passengers can put their feet directly on the heaters. It is common experience that a passenger clothed in outdoor wearing apparel will be more comfortable if he feels warmth at his feet, even with a reduced car body temperature.

Electric floor heaters might be inclosed in cast aluminum housings which could be designed with ample strength to stand the service to which they would be subjected and which could be equipped with radiating fins for the purpose of giving them increased wattage capacity. The possibility of greatly improving the effectiveness of the heater equipment by schemes such as this makes the development of such forms of heaters a much needed and desired undertaking.

The usual form of forced-draft stove used for car heating purposes more nearly provides for proper floor temperatures than do the usual installations of electric heaters. Where the duct along the side of the car is arranged with outlet openings close to the floor surface, the floor itself is usually maintained in a fairly comfortable condition. Proper installation of such systems, however, must provide a hot air duct on either side of the car. Even with this arrangement no provision is made for the comfort of passengers standing in the aisle.

FACTORS IN DETERMINING HEATER CAPACITY

In determining the heater capacity required in a car, the temperature rise used in the calculation is fixed by the difference between the interior car temperature desired and the minimum outdoor temperature at which it is desirable or practicable to maintain this car temperature. The heat losses from a car consist of two parts, namely, the heat radiated through the walls to the outside atmosphere and that required to heat the incoming air for ventilation from the outside temperature to that desired on the interior. In calculating heater capacity, consideration should be given to the amount of heat supplied by the passengers themselves. A normal adult passenger will supply at least 350 to 400 B.t.u. per hour, and this heat will be effective for maintaining the desired car temperature.

The heat lost through the walls of the car is a function of the difference in temperature between the interior and the exterior, and of the total square feet of radiating area exposed to the outside atmosphere. The so-called radiation constant is a factor which represents the effect of the type of construction and material in the car structure upon the heat loss through the walls. For any given car structure, the quantity of heat lost to outside atmosphere is a constant for each degree difference between the interior and exterior temperatures, providing that conditions within the car remain comparable. In other words, the total heat loss when the exterior temperature is 0 deg. F. and the interior temperature is 40 deg. F. will be the same as the loss when the exterior temperature is 30 deg. F. and the interior temperature is 70 deg. F.

DETERMINATION OF HEAT LOSSES BY RADIATION

The radiation constant is usually expressed as the number of B.t.u. loss per square foot of exposed area per degree difference in temperature between the interior and the exterior. Experiments have demonstrated that the interchange of large volumes of air through the comparatively small inclosed space represented by the interior of a car results in a movement of the interior air relative to the surrounding surfaces and causes a considerable variation in the heat loss for any given difference in temperature, as the volume of air drawn through the car is increased or decreased. The accompanying curves represent this variation in the radiation constant for a conventional type arch roof car with ¼-in. thick headlining and steel side girders lined below the belt rail with wood panels for interior side lining. An accompanying set of curves also illustrates the complete heat balance calculations for this car, and includes all of the factors which enter into the problem of heater capacity calculations.

Operators who have studied the subject are rapidly coming to the opinion that some form of regulation of the car heater must be provided to prevent excessive car temperatures in mild weather. Too much heat is as uncomfortable as, or more uncomfortable than, insufficient heat. The importance of proper regulation cannot be overstressed from the standpoint of passenger comfort. In addition the economies to be derived from the installation of regulating devices in connection with electric heaters have been demonstrated repeatedly by carefully conducted tests to be well justified as an investment on the basis of savings in energy effected.

DEVELOPMENTS IN ELECTRIC HEATER CONTROLS

There have been available for a number of years various forms of reliable automatic heat regulating devices or thermostats. Developments in such apparatus have been steadily going forward and have been in the nature of simplification and consequent reduction in cost and maintenance. Such devices usually consist of two primary parts, namely, a thermostatic or regulating element and a form of contactor for cutting the heaters on and off when the car temperature rises above or falls below a point that has been previously determined.

Modern car thermostat elements have been made exceedingly sensitive in their operation. In a type illustrated herewith several interesting features are incorporated. In addition to a carefully designed flexible mounting to absorb vibration and prevent separation of the mercury column, a spring contactor is incorporated so that the heat on the car will be cut off if the glass stem is broken by malicious tampering. This is to prevent a difficulty which has been encountered in the past due to trainmen breaking the thermostat in order to allow the heat to remain in the car continuously. In the contactor portion of this thermostat equipment, which is now available, development has been along the lines of eliminating as many moving parts as possible to prevent failures and at the same time reduce the maintenance cost.

An accompanying set of curves illustrates the effect of thermostatic control on car temperatures as determined by very carefully conducted tests carried out in Chicago, where the surface cars have been entirely equipped with thermostatic control.

PREHEATING DESIRABLE FOR COMFORT OF EARLY PASSENGERS

Although the efficiency of an electric heater might be 100 per cent, it requires considerable time to raise the temperature in the car body 30 or 40 deg. Consequently if in cold weather the heaters are not turned on until the car goes into service, it will take a considerable time before the car interior is at a comfortable temperature. It is important therefore, in cold weather, to preheat the cars in the station in order that they may be at proper temperature for early passengers. It has been found upon investigation of complaints relative to cold cars that neglect of this requirement sometimes results in cars being cold for three or four hours after going into service. This is due to the fact that after the car is in service the opening and closing of doors or operation of the ventilating system dissipates a large part of the heat supply and consequently does not allow the car temperature to come up to normal.

The data shown in the accompanying curve represents the heating characteristic for a type of city car with monitor deck, standing in the open with all heaters on and doors closed. The time required to preheat cars so that they will be comfortable will vary materially with the capacity of the heaters and the type of cars, but for an average city car, a tabulation herewith shows in round numbers the minimum period of preheating required to insure that cars which stand in an unheated carhouse over night will be warm enough upon going into service to avoid complaint by passengers. This tabulation is based on a 10-kw. total heater capacity in the body of a city car and presupposes the switches arranged in steps so that the first step will give approximately 3.3 kw., the second 6.6 kw. and the last step 10 kw. of heating energy. If cars are stored in the open, the time of preheating indicated below may have to be increased approximately 20 per cent.

Temperature in Carhouse	Points Heat	Length of time of Preheating
45 deg.-40 deg. F	1	20 min.
40 deg.-35 deg. F	1	30 min.
35 deg.-30 deg. F	2	30 min.
30 deg.-25 deg. F	2	40 min.
25 deg.-20 deg. F	3	40 min.
20 deg.-15 deg. F	3	50 min.
Below 15 deg. F	3	65 min. or more

Mechanical and Electrical Equipment Keeps Pace—I

Making a Pound of Material Do More Work

Motors show lighter weight per horsepower; trucks are improved as to weight, riding qualities and brake arrangement; wheels, gears and other parts have received attention in the development work that has been going on recently. This chapter tells the story of how all the equipment is being improved to meet present-day service requirements and points out the prospects for future development

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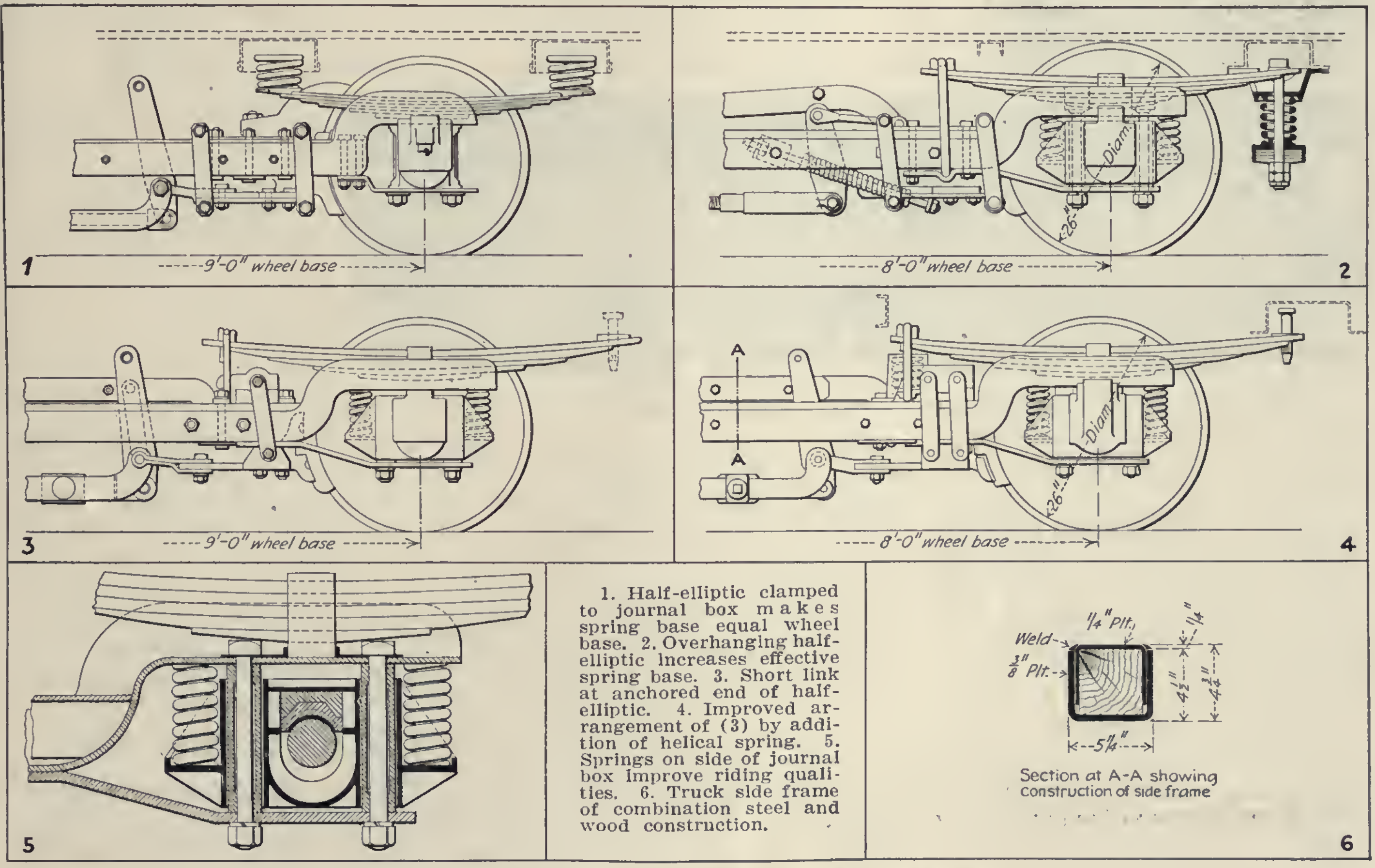
As THE performance of the modern car depends very largely upon the mechanical and electrical equipment installed the developments made in this equipment properly form a very important part of any discussion of the general subject of car design. The mechanical and electrical equipment on a car also play a very important part in the success achieved by the complete design in furnishing rapid, convenient, comfortable and safe transportation.

The manufacturers of motors, control, trucks, wheels, brakes, gears, etc., have made such varied and persistent efforts to anticipate the operators' requirements and to bring out more efficient and more reliable apparatus that it will be possible here to discuss only the high spots in the story; and possibly to indicate some few of the desirable future developments for which progressive manufacturers and operators are both striving. A great amount of energy, thought and expense is being directed in an effort to make the electric rail vehicle still more capable of meeting the extremely severe combination of conditions with which it has to contend in its present-day use.

PROGRESS IN MOTORS LARGELY A MATTER OF REFINEMENT

The railway motor of the past few years has been a most efficient and reliable machine. Recent developments, therefore, and also the developments that may be expected in the future, consist primarily of refinements in design. These have been and will be for the purpose of reducing weight and cost, either by the application of higher grade materials or by the careful reproportioning of parts as a result of detailed study of the stresses involved.

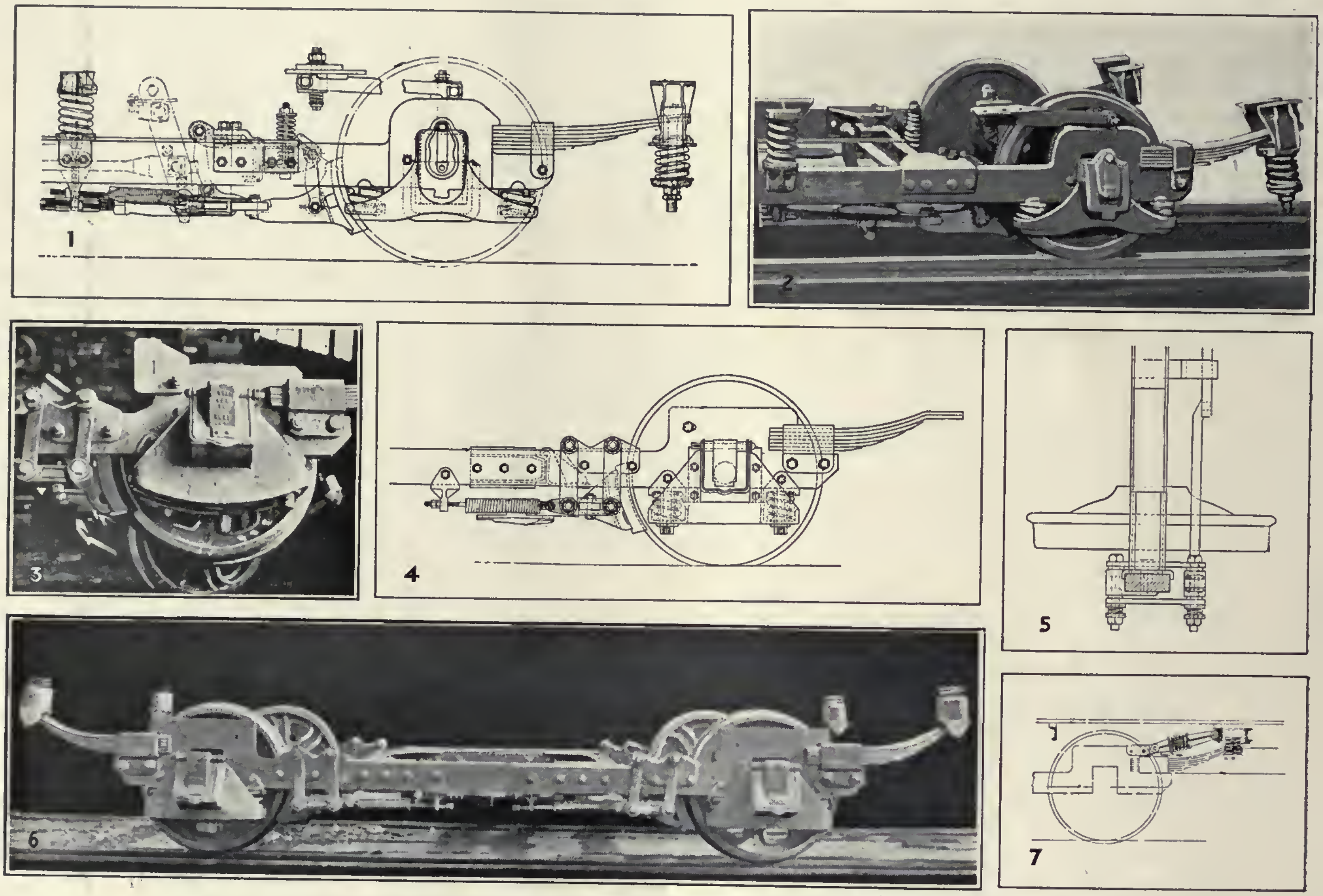


1. Half-elliptic clamped to journal box makes spring base equal wheel base. 2. Overhanging half-elliptic increases effective spring base. 3. Short link at anchored end of half-elliptic. 4. Improved arrangement of (3) by addition of helical spring. 5. Springs on side of journal box improve riding qualities. 6. Truck side frame of combination steel and wood construction.

Single-Truck Side Frame with Various Spring Arrangements

The wide use of the fully ventilated type motors having air intakes opening direct to the atmosphere has resulted in very careful attention being given to the question of waterproofing the armature. In the design of armature shafts and bearings, application of higher grade materials and more liberal dimensions are outstanding present tendencies. There also seems to be a tendency at the present time for manufacturers to give the modern light-weight fully-ventilated motor a more conservative application rating, in comparison with its actual one-hour rating, than has previously been the case.

In attempting further reductions in motor weight, the possible applications of light-weight alloys are very limited, due to the inherent necessity for maintaining the magnetic circuit. This is true, at least, for the armature core and motor frame. The use of aluminum for electrical conductors is being tried by a number of properties, particularly in connection with field coils, and it is apparently proving satisfactory. The very large saving in unsprung weight which this makes possible has aroused the interest of many railway men.



Construction of Single Trucks

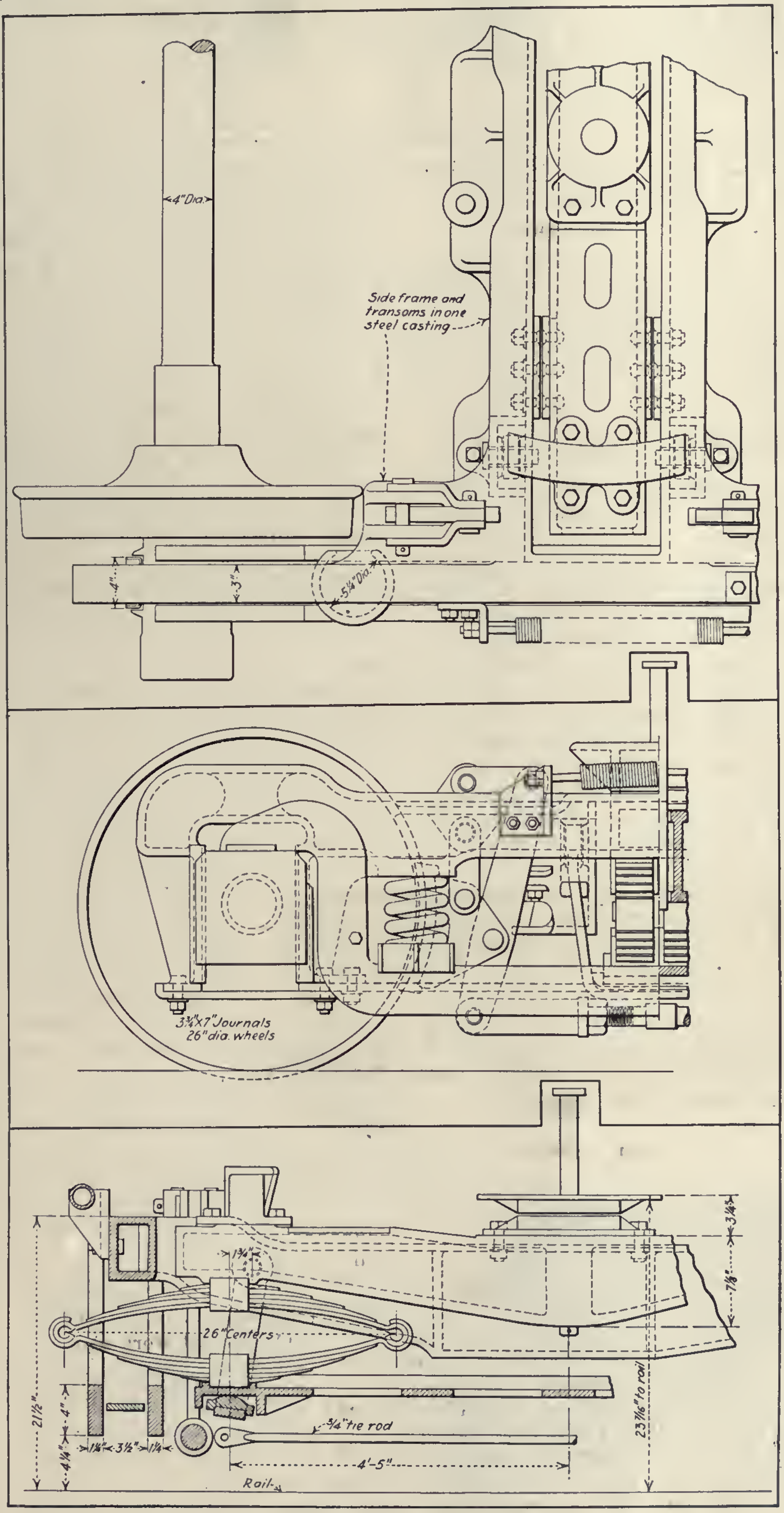
1 and 2. Forged steel side frame with quarter-elliptic springs and auxiliary helicals.
3. Parallel link brake hanger.
4 and 6. Machined steel side-frame construction.
5. Cross-section of side frame in (4).
7. Detail of body connection.

In the development of small-sized motors having a minimum possible weight, for use on safety cars, the subject of anti-friction armature bearings has been receiving continued study. The object sought in the installation of this type of bearing is not only the elimination of friction and reduction in the size of the bearing housing, but is also a means of maintaining a uniform minimum air gap, which reduces the reluctance of the magnetic circuit, with a consequent reduction in the volume of magnetic material required to obtain a given output. The usual form of construction at first employed utilized ball bearings at both the commutator and pinion ends of the armature. Although many motors with such bearings have been giving satisfactory service for a number of years, some difficulties have been experienced with hot bearings, due to the lack of adequate provision for difference in expansion between the armature and the housing frame. Experience has also demonstrated that extreme care must be exercised in the application of this type of bearing to provide against the flow of electric current through the bearing, which quickly destroys the surface of the balls and results in early failure.

The advantages of using anti-friction bearings are so great that very serious study is still being given this subject. Present thought along these lines contemplates the use of ball bearings at one end of the armature to provide for end thrust, with a tapered type of roller bearing at the opposite end to allow clearance for expansion of the armature. Engineers who have been studying the problem are optimistic as to the results to be obtained by this procedure. The prospects seem to be very favorable for early culmination of development work along this line and a general improvement in electric motor performance resulting from utilization of better bearings.

REDUCTION IN MOTOR WEIGHTS

The remarkable development of the railway motor is best illustrated by the reduction in the weight per horsepower. Although the ratings of early type motors on a basis comparable with present ratings are very difficult to determine, it is of some interest to compare, at least in a rough way, the results obtained. The problem of comparison is rather complicated by the fact that since the introduction of commutating poles and other refinements which made possible operation at higher voltages, railway motors have come to be rated on a 600-volt basis, whereas the earlier types were rated at 500 volts. It is fair, however, to assume that although a comparison of horsepower output at the same voltage would give a true indication of the results obtained from the introduction of ventilation and higher grade materials, the refinements which made possible reliable operation at 600 volts should be credited with the increased output in calculating weights per horsepower for modern motors. In determining these figures for modern motors it must also be borne in mind that manufacturers have shown an increasing tendency to make commercial motor ratings considerably below the actual capacities shown on test. One reason for this is the fact that modern ventilated motors will not show an overload capacity comparable with earlier and heavier designs, and hence a larger margin between commercial ratings and actual capacities is necessary to avoid abuse in service and consequent excessive temperatures. Another factor, particularly in the smaller sizes operating at comparatively high armature speeds, has been the fact that the capacity is limited by the mechanical structure rather than temperatures.



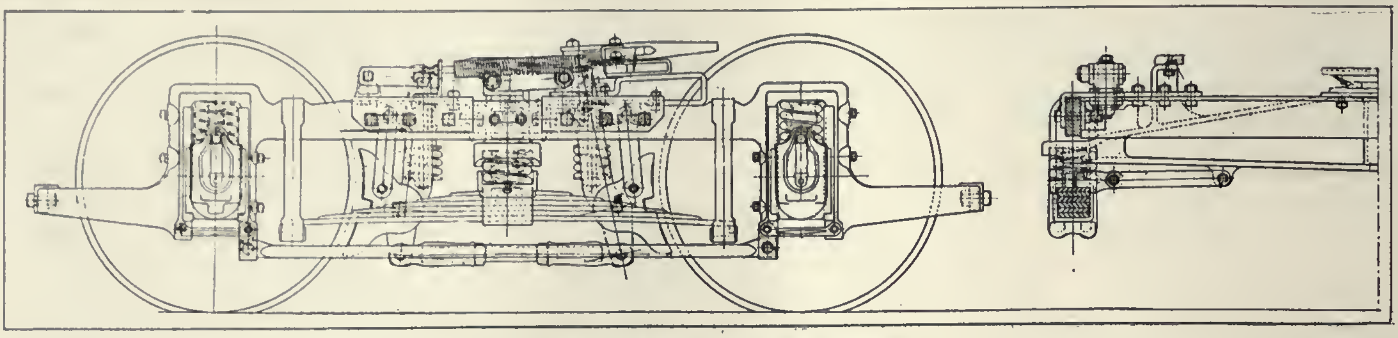
M.C.B. Type of Pivotal Truck with Transoms and Side Frame Cast Integrally of Steel. Full Elliptic Spring Arrangement Under Bolster Shown Below

On the above basis, therefore, the early forms of electric railway motors weighed approximately 120 to 130 lb. per horsepower judged by present methods of rating, whereas this has been reduced in the recently developed types of modern motors to a weight per horsepower as low as 32 lb. By still further refinement in design and possibly by the general application of anti-friction bearings we may expect an ultimate development along existing lines to 30 lb. per horsepower output.

The introduction of improved methods of driving the car, such as are discussed below, and more flexible motor suspensions, would probably allow higher armature speeds and reduced mechanical requirements. This would enable still further reductions in the future.

METHODS OF DRIVING CARS

The method of transmitting power from motors to car wheels is a field so well standardized that any important development must be of a funda-



Forged Side Frame Truck with Longitudinally Mounted Half-Elliptic and Light Load Helical Mounted Above

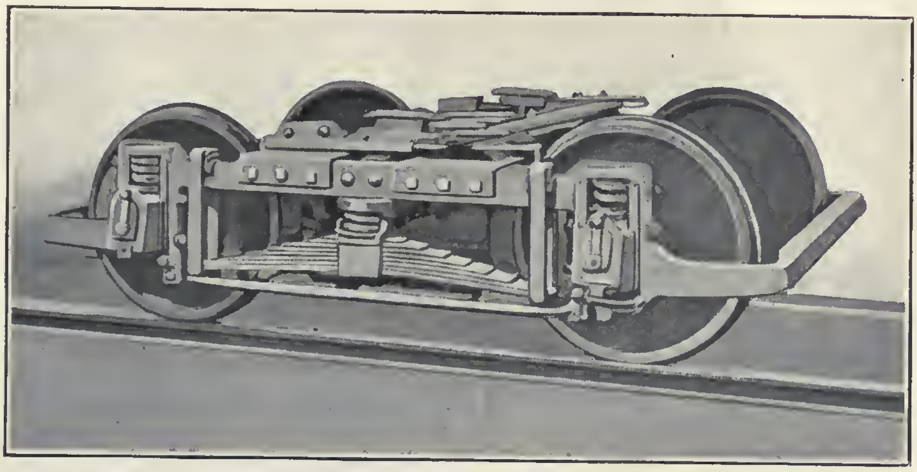
mental character and therefore embody radical departures from present practice. Some tendency in this direction is noted in later paragraphs. The developments in present driving mechanisms consist mainly in improvements as to materials and performance.

Developments in materials used for gearing as well as in their treatment, and developments in the design of teeth, have accomplished marked improvements. As a result, the mileage of the ordinary fifteen-tooth motor pinion has been increased from between 15,000 and 20,000 miles to an average of approximately 90,000 to 100,000 miles. The application of large capacity motors in the form of two-motor equipments was handicapped by the limited strength of the teeth in the common form of Brown & Sharpe 14½-deg. type of gearing. With this generally used tooth shape, and with the comparatively large diameters of armature shafts that were required, the strength of the pinion also became a limiting factor in obtaining maximum desirable gear reduction.

The recent development of the long and short addendum type of gear tooth, both in the form of spur and helical gears, has been a marked advance in the solution of this problem. In addition, certain types of compromise pinion teeth have been designed, which enable the advantages of the long addendum pinions to be obtained and still make them operable with Brown & Sharpe contour teeth on the gear. This compromise design utilizes one tooth less on the pinion and consequently gives a greater gear reduction.

Helical gears are being used in large quantities by a number of properties. They not only give the advantages of the long and short addendum tooth contour, but also give what amounts to a longer tooth face with the same width of pinion or gear. In addition some railways report that they decrease vibration and gear noise materially and hence tend to reduce maintenance costs. On the other hand, some railway men feel that the helix angle has been decreased so much by the necessity of overcoming end thrust that much of the effectiveness of this design has been lost.

Spring gears, which have been used in connection with large power units on steam-line electrification work for the purpose of introducing a slight cushion in starting, do not seem to be practical for single light car drive, due to the limited space available as well as the probable high first cost and maintenance expense.



Side View of Truck Shown at Top of Page. Swing Links for the Half-Elliptic Are Designed to Dampen Side Oscillations

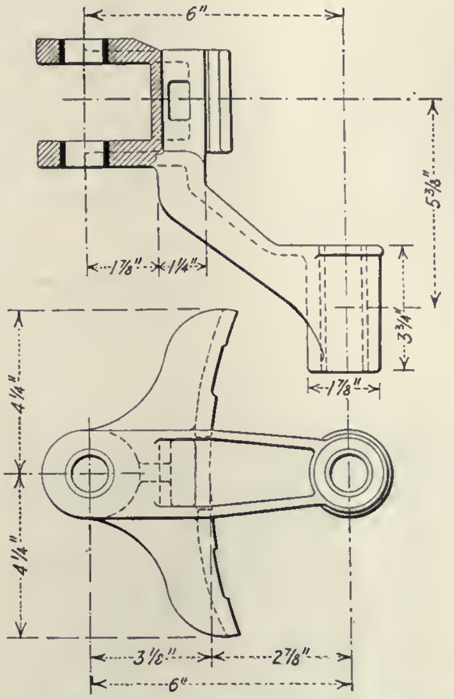
There has been in the minds of progressive engineers, both in this country and abroad, for a number of years a conviction that a basic improvement in the method of driving from the motor to the car wheels could and should be effected. A number of designs have been developed for the purpose of supporting the motor directly on the car body instead of on the truck frame and axle as at present, so as to support this weight on the truck springs instead of having it largely unsprung, and several sample cars have been constructed, principally in Europe. One experimental car built in Paris, which illustrates this line of development is shown in an accompanying illustration.

In most of these designs there is a tendency to follow to a large extent automotive types of constructions, mounting the motor longitudinally on the car body and driving through a shaft and universal joint to either a bevel or worm drive differential, arranged on the axle assembly. A secondary result which is looked for in this construction, and which is by no means unimportant, is the accomplishment of quieter operation. This should of course result from a type of drive in which the gears could be inclosed in an oil-tight housing.

There are many problems to be overcome in connection with this general type of design. The use of any form of automotive rear axle construction involves a higher quality of maintenance workmanship than is at present available in the average railway shop. The construction almost necessitates the use of either ball or roller bearings, particularly between the gear housing and the axle, in order to make the housings oil tight and at the same time maintain the parts in accurate alignment. The use of a differential involves a split axle and raises the question of the proper maintenance of wheel gage for operation on track.

The possibilities that would come

from the successful consummation of development in this direction are so fundamental and all-embracing from the standpoint of improving the entire performance of electric rail vehicles that both operators and manufacturers are justified in the expenditure of a great deal of time and effort on the subjects. Although bevel gear drives were at one time unsuccessfully tried in the early development of electric railways, the remarkable advances that have been made in the design and manufacture of such equipment for automotive vehicles make present consideration of this type of drive for electric rail vehicles an altogether different matter than when tried fifty years ago. This is particularly emphasized by the reported development in the automobile field looking toward the elimination of the differential and the substitution of solid axles. As the present type of electric railway drive is a solid axle construction, the application of worm or bevel gears without the use of a differential does not seem such a remote possibility.



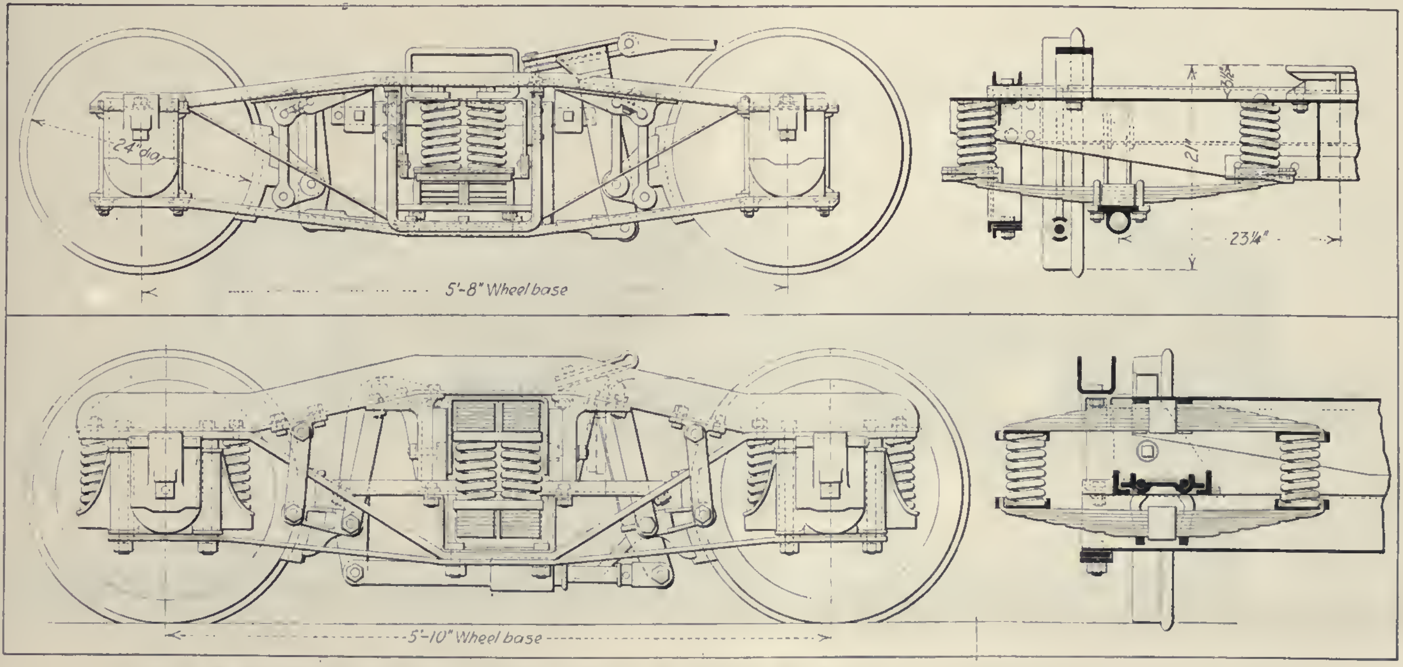
Brake Head with Offset Arm for Parallel Link Hanger—Designed to Maintain Uniform Shoe Wear

WHEEL DESIGN PROGRESSING TOO

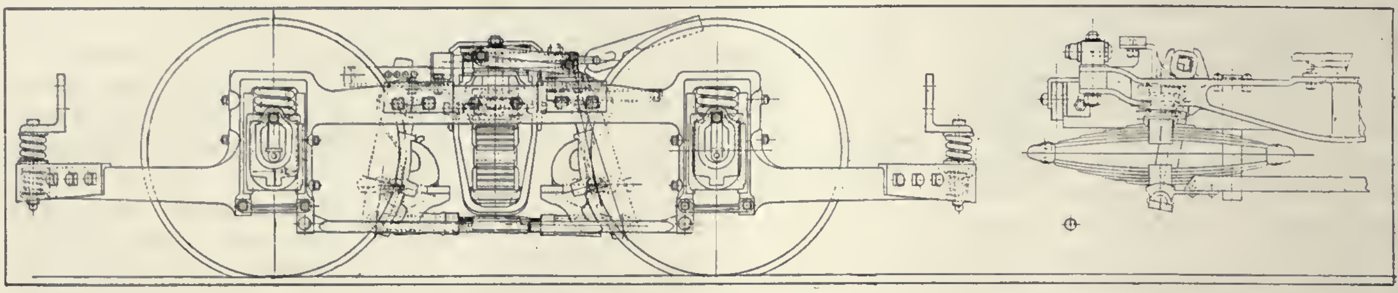
A consideration of car wheels leads immediately to mention of the markedly increased popularity of small diameters. This has been due to the saving in weight accomplished and also to the desire for reduction in floor height for the purpose of facilitating passenger interchange. Although cast-iron and cast-steel wheels are used to a considerable extent, the high mileages obtained and the freedom from flat wheels with the rolled-steel wheel has resulted in wide adoption of this type. The steel wheel is particularly popular in congested city service, where frequent stops are required. Rolled-steel tires are in some cases applied to a cast center construction, but the problems encountered in maintaining the tires tight have increasingly limited the use of this type of wheel. There has been a constant effort by both operators and manufacturers to reduce to a minimum the weight of rolled-steel wheels, and the demand for still further reductions in weight has resulted in the recent development of improved rolling methods for fulfilling this requirement.

The importance of decreasing noise in operation and also of eliminating vibration as far as possible has resulted in some experimental work in connection with the introduction of a sound and vibration absorbing material between the tread and body of the wheel. Attempts to introduce rubber at this location by means of ingeniously arranged types of flanged treads, constructed so that the rubber would be solely in compression and relieved of all transverse and circumferential stresses, have not been particularly successful. This has been due primarily to the fact that the bearing area available, with the comparatively narrow tread width used on street car wheels, subjects the rubber to excessive compression stresses and results in its rapid disintegration. The possibility of utilizing some other material than rubber which will possess the necessary vibration absorbing qualities offers an interesting field for investigation.

Standardization in the design of both rail head and wheel contours has occupied the attention of committees of the American Electric Railway Association for a number of years. It is to be hoped that the work of these committees will culminate in the formulation of a com-



Above—Arch-Bar Type of Built-Up Side Frame with Half-Elliptic Bolster Springs Supported from Long Link. Below—Modified Construction with Helicals at Sides of Journal Boxes and Two Half-Elliptics Under the Bolster



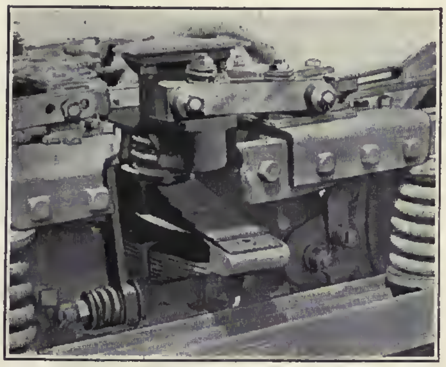
Forged Steel Side Frame Truck with Full-Elliptic Springs Under Bolster

paratively small number of standard designs, which should in turn result in decreased cost to manufacturer and railway.

HOW TRUCK DEVELOPMENT IS SHAPING

The construction of car trucks has maintained a steady and progressive development. Reductions in weight as well as in maintenance, together with improvement in riding quality, have been the outstanding objectives. The latter requirement has been particularly pressing, due to the rapid developments made in light-weight car construction. The sudden return to the single-truck design with the Birney type of safety car, and the light-weight construction demanded, produced a marked development in this form of truck.

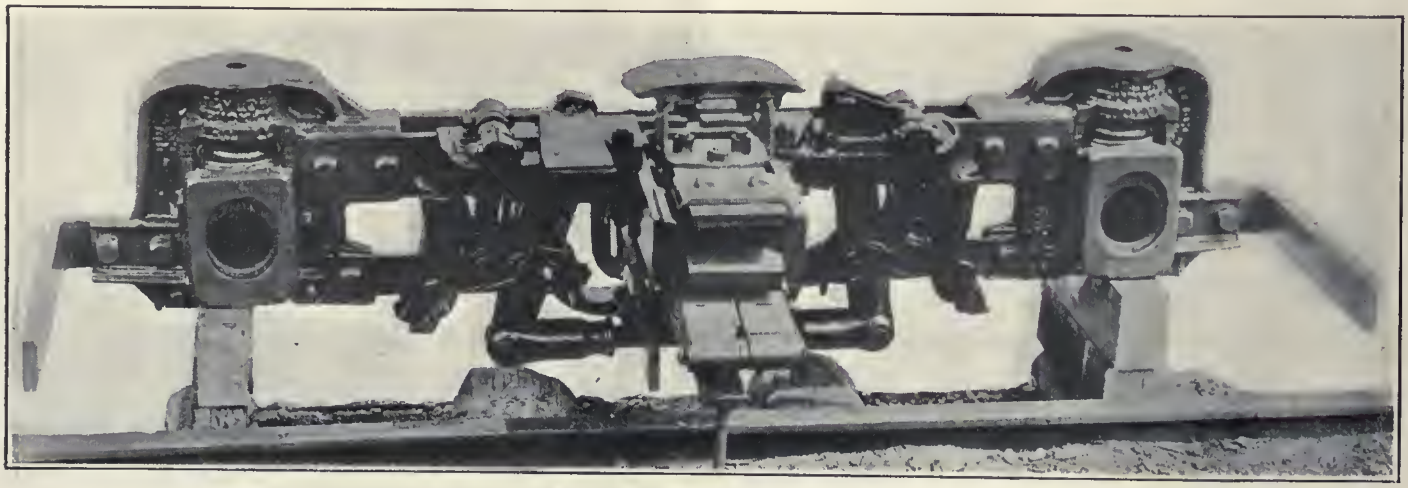
The principal differences in present types of construction found in the trucks built by various manufacturers are largely centered in the methods of constructing the side frame and in the arrangement of springs to produce easy riding. In addition, the layout of brake rigging and design of brake hangers for the purpose of eliminating chattering and excessive maintenance represent important variations in construction. Combined with the arrangement of springs to provide vertical flexibility, various methods and devices are utilized for the purpose of allowing lateral movement of the bolster and at the same time limiting the amplitude of its oscillations. Further refinements in design which are incorporated in the products of various manufacturers are primarily for the purpose of increasing rigidity and durability of the structure and decreasing maintenance costs. Rather wide departures from conventional designs have recently been made by several operators who have felt the need for more fundamental developments than were available in the products of the equipment manufacturers, and this work is at the present time undergoing still further evolution.



Sectional View of Above Truck Showing Arrangement of Full-Elliptic and Light Load Helical Mounted Above. Guides for Bolster Prevent Rubbing

CONSIDERABLE IMPROVEMENT IN SINGLE TRUCKS

In the construction of single trucks a number of very interesting designs are in use. The demand for reductions in weight and at the same time the requirement of minimum maintenance and easy riding are reflected in the variations in the structures employed. A tendency to avoid built-up side frames and to secure the rigidity and freedom from maintenance offered by a one-piece side structure is manifest. A tendency to avoid heavy castings wherever possible and to substitute lighter weight forgings is also evident in the designs. For the purpose of obtaining minimum weight, however, a type of construction utilizing two deep channels of high-grade steel assembled so as to form a closed box structure filled with wood and welded together along the upper corners of the box is illustrated in an accompanying cut. Of the manufacturers utilizing a one-piece side frame, one type of construction is machined from a solid flat billet and the other is forged to the required shape under heavy hydraulic pressure.

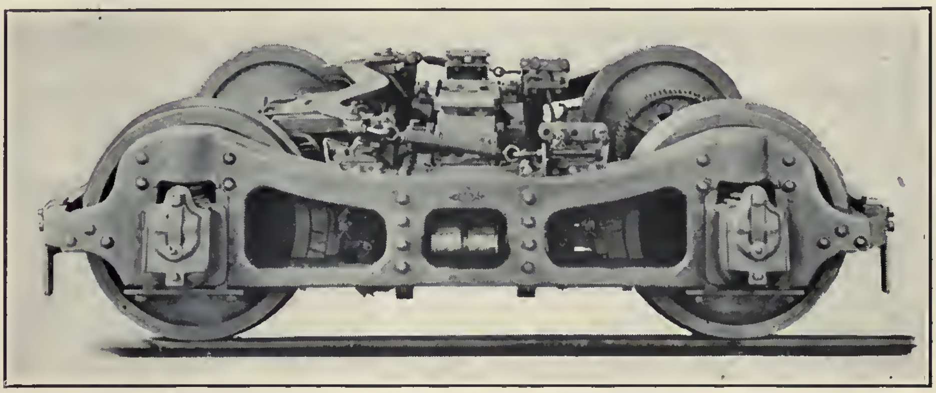


Side Frame Assembly, Showing Direct-Action Brake and "Y"-Shaped Hangers to Maintain Shoe in Alignment. No Brake Beam Is Used

Still another construction employed is to press the side frames out of a comparaively thin plate, providing flanges and ribs at the critical points in the structure in order to reinforce the pressing to withstand the stresses imposed and to give the desired stiffness.

The application of brake rigging parts to the single truck is accomplished by several interesting arrangements designed to improve the performance of the brake by the elimination of chattering and by insuring a true and square contact between the shoe and the wheel. The method of employing two parallel link hangers, applied either directly to or adjacent to the side frame so as effectively to guide the shoe in its movement back and forth, is apparently considered best by several manufacturers, although the center hanger back of the brake beam with a single brake hanger for each shoe head at the side is also widely used. The objective in all forms of brake hanger construction is the elimination of chattering and the insurance of a uniform bearing each time the shoe is brought in contact with the wheel.

The arrangement of springs has a particularly important significance in connection with the results obtained in the operation of single trucks. With axles supported squarely in the truck frame at the journals, the requirement for negotiating the sharp curves existing in most cities limits the allowable wheelbase to between 8 and 9 ft. as a maximum. Since the car body on the usual type of single-truck car extends considerably beyond these lengths, the overhang each side of the wheel line is comparatively large and results in a tendency toward teetering and nosing in operation. Various methods are employed to overcome this condition, and practically all center around the general idea of increasing the effective spring base by the extension of the truck side frame itself a considerable distance beyond the wheel line at each end so as to act as a support for springs mounted at this point. By the use of overhanging half-elliptic springs secured at one end to the truck side frame, or again by the application of quarter elliptic springs rigidly secured to the side frame close to the pedestal, the same effect is obtained. All three of these types of construction are illustrated in the accompanying drawings and pictures.



This Truck Has Pressed Steel Side Frames. A Volute Spring Inside the Full-Elliptic Limits Deflection so that the Elliptic Can Be Made More Flexible

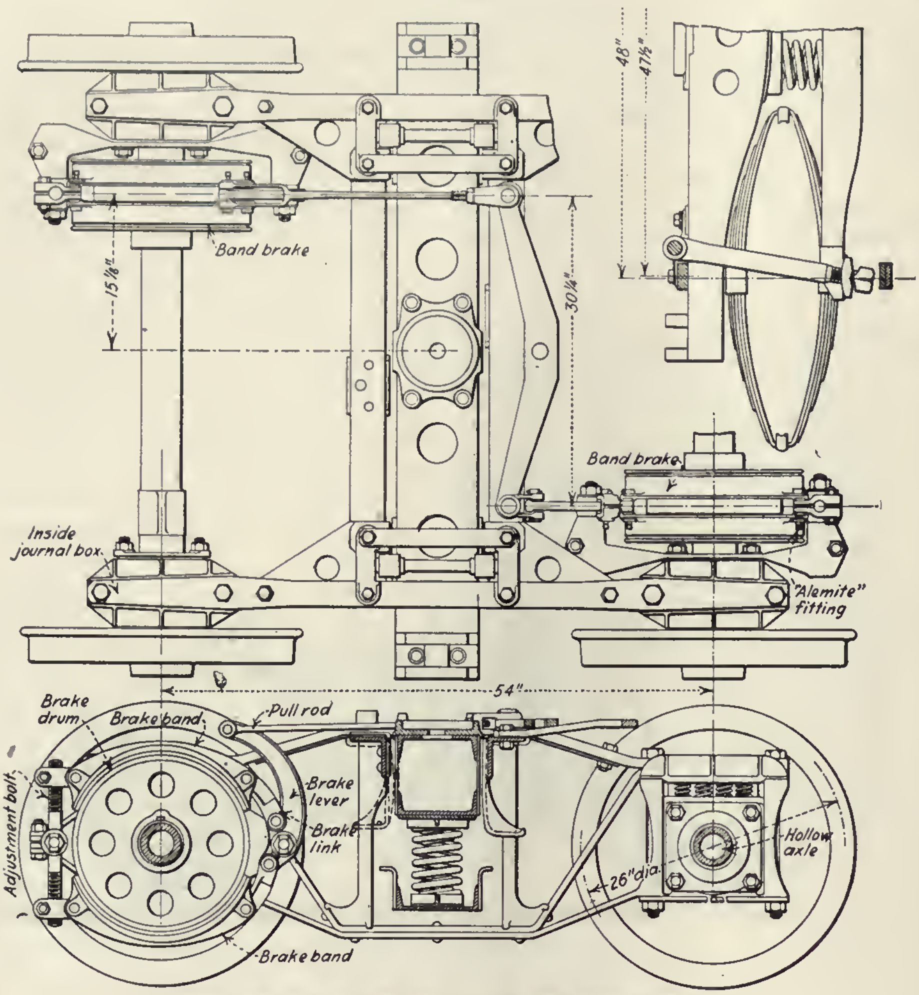
In the illustration on page 511, No. 1 shows a simple spring arrangement utilizing a half-elliptic spring fastened rigidly to the journal box, with short helical springs at either end extending to the car body support. In this construction the effective spring base is equal to the wheelbase of the truck. No. 2 illustrates the next step in providing a more flexible spring construction. In this arrangement the truck side frame is supported on helical springs mounted on extended ears on the journal box, and the half-elliptic is, as in No. 1, again supported on the journal box, but its inside end is fastened by a long link to the truck side frame instead of to the body. The outside end of the half-elliptic is connected to the body through a comparatively long helical suspension spring, which allows considerable lateral and longitudinal motion. The long link employed for fastening the inside end of the half-elliptic to the truck side frame also contributes to a comparatively free movement.

No. 3 illustrates the next step in the development of this type of truck, in which the loose and flexible connection to the body at the outside end of the half-elliptic is eliminated, and the link connecting the inside end of the latter to the truck frame is materially shortened. The final development in this design to produce easy riding and at the same time limit excessive oscillation is shown in No. 4, where the construction is similar to No. 3 except that a comparatively short compression spring is interposed in the link connection to the truck frame for the purpose of reducing somewhat the strains imposed on the parts at this point and giving a little added vertical flexibility.

The type of construction utilizing a machined one-piece steel side frame is shown in illustrations on page 512. Here the side frame is carried on short helical springs also resting upon ears extending from the sides of the journal box. The main body supporting spring consists of a comparatively short and stiff quarter-elliptic rigidly fastened to the side frame adjacent to the pedestal. The connection to the body is usually made through a short helical spring, flexibly connected to the end of the quarter-elliptic. A flexible device for absorbing lateral strains between the body and truck and for maintaining the body and truck in alignment is also shown in the illustration. The details of the quarter-elliptic spring fastening to the side frame are shown and also a good view of the brake hanger arrangement and of the journal box construction. A general view of this same type truck equipped with ball-bearing journals is included.

A forged-steel side-frame single truck, illustrating still another method of supporting the side frame on short helicals set on extension ears on the side of the journal box, is shown on page 516. The quarter-elliptic spring is fastened with a strap and projects under a lip on the pedestal frame to secure a firm anchorage. The method of connecting to the body is clearly shown by the link and helical spring fixture illustrated. This type of truck employs a centrally supported brake-beam hanger with the brake hangers supported from gusset plates bolted to the side frame. The brake hanger is of the half-ball type, in which a semi-ball and socket arrangement with a compression spring on the connecting bolt is utilized to compensate for wear, and thus to prevent vibration and chattering as far as possible.

Modern trucks of the swivel type show a wide diversity in construction. The side frames are either



Minneapolis Light-Weight Truck with Band Brakes and Hollow Axles

forged in one piece, made of a steel casting, built up of the conventional diamond arch-bar construction, or built up of structural shapes. The side forged frame has the advantages of a one-piece rigid structure, in which by proper design the metal in the forgings can be distributed accurately in proportion to the stresses imposed. This type of structure gives a very rigid truck and freedom from maintenance trouble on the side frame structure.

In the application of cast steel to modern trucks, the M.C.B. equalizer bar type of construction lends itself to the elimination of the heavy pedestal castings, which were used with earlier trucks of the cast-steel type. In recent construction the truck side frame and transom have been cast in one unit, giving an extremely rigid structure from the standpoint of maintenance of alignment, and also allowing the patterns to be designed so that brake rigging parts and spring suspension parts can be conveniently applied.

The arch-bar type of truck gives both low weight and first cost. In this type of truck high grade heat-treated steels of either high carbon or alloy composition are being used to increase the structural strength of the built-up side frame. In some cases the arch bar is of the conventional flat section, while in other trucks a channel-shaped member is used for the bar in order to obtain the maximum sectional rigidity with minimum weight.

As in the case of the side frame, so also in the spring suspension and brake rigging arrangement do the products of different manufacturers show a variation over a considerable range of design. The customary full-elliptic spring under the bolster appears in a number of constructions, but various additional features have been added for the purpose of obtaining improved riding performance. The heavy spring plank formerly used under springs arranged in this manner has in some cases been entirely eliminated. The full-elliptic spring is carried in a swinging hanger or swing link provided with an appropriate socket at the lower end to form a seat for the lower spring band, and the two hangers or stirrups are tied together across the truck with a comparatively light structural member.

The introduction of light helical springs mounted on top of the full-elliptic and set into an upper and lower spring cap, which is provided with lugs which come in contact after the capacity of the helical is exceeded, are utilized for the purpose of absorbing light road shocks and vibrations, while the car is operating under comparatively light load. This light action spring goes out of operation when the spring cap lugs come in contact, and from that point on the total load is carried by the full-elliptic. Bolster guide links fastened between the truck transom and the bolster are utilized in some trucks of this general type for the purpose of preventing the bolster from rubbing against the transom sides.

In addition to the simple arch-bar type of construction with the bar resting directly on the journal box, some recent trucks utilize a type of construction in which comparatively long helical springs are provided between the arch bar and projecting ears on the sides of the journal box. The side frame, instead of being clamped down around the box by the long bolts between the top and bottom bars, is clamped to tubular struts which ride through openings cored in the journal box structure, so that the equivalent of a pedestal construction is provided.

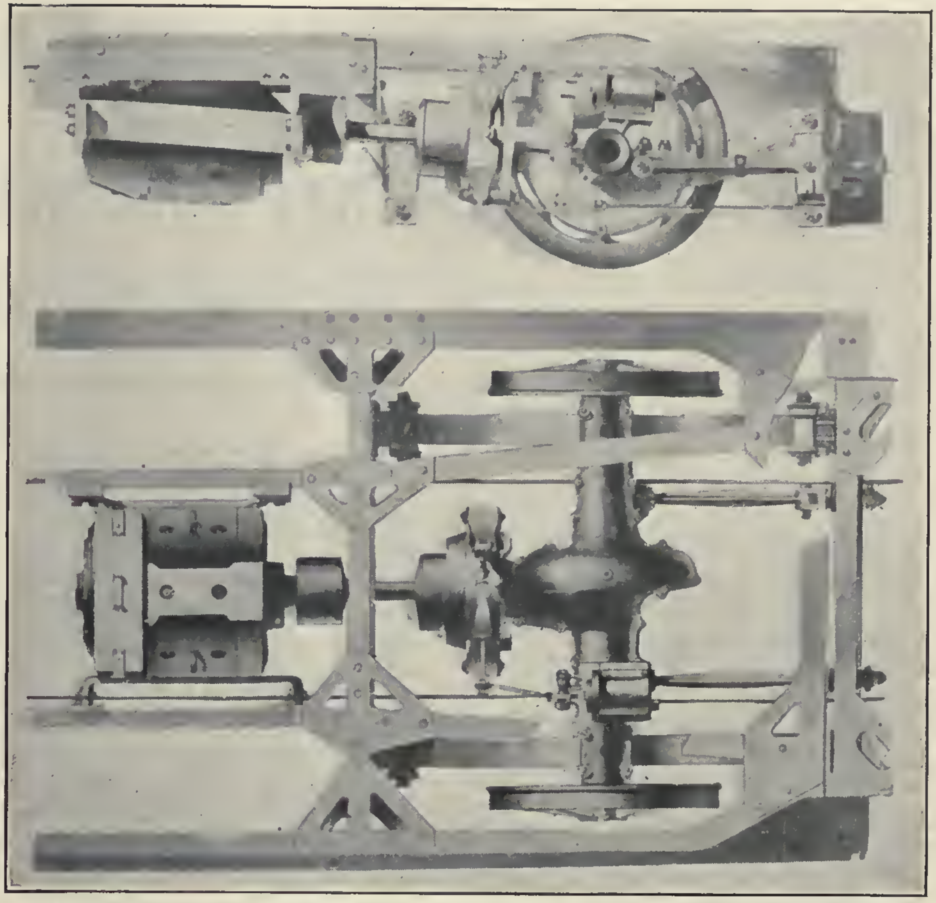
The use of half-elliptic springs carried longitudinally in links or stirrups hung over the top of the side frame has been customary for a number of years. The light-load helical spring described above is utilized with this construction and is imposed between the top of the half-elliptic and the truck bolster. The design of link in which the half-elliptics are carried is such that the amplitude of the lateral swing is rapidly checked by the angularity which these stirrups assume. In modern trucks the entire theory of securing easy riding from the standpoint of absorbing lateral oscillation seems to be the provision of relatively short suspension links in the spring system, which are comparatively free at the beginning of an oscillation, but which quickly assume an angularity that checks the amplitude of the swing.

Another type of spring arrangement which has been used to a considerable extent, particularly in trucks of the modified arch-bar construction, is a type in which a half-elliptic spring mounted crosswise is carried independently at either side of the truck in a long stirrup supported from the transom. At the ends of the half-elliptic comparatively long helical springs are set up vertically and directly support the truck bolster. This same general type of construction is represented by two half-elliptics mounted crosswise at either side of the truck, one fastened to the truck bolster above and the lower fastened in short swinging links carried on a comparatively large structural member extending across the truck. This lower structural member is used to tie the two sides of the truck together, and the usual transoms above are largely made of wood. Between the ends of the half-elliptic springs described vertical helical springs are set so as to hold the two half-elliptics a considerable distance apart.

TRUCK BRAKE RIGGING

In addition to the conventional type of brake arrangement and brake hangers, the desire to eliminate uneven brakeshoe wear and chattering has led to the use of a number of interesting constructions designed to overcome these difficulties. In an accompanying drawing, page 515, a detail of an offset brakehead is shown, in which an arm is brought out beyond the face of the head a considerable distance and forms a pivotal point for a parallel link hanger, one link being back of the head and the other in front of it, so as to guide the shoe toward the wheel with a support both in back and in front of the shoe. The hangers used with this type of head consist of two slightly bent springs with the convex faces together, so that when the pins are inserted in the head and in the hanger support the springs exert a slight outward pressure. It is stated that they effectively prevent any looseness or chattering.

Another type of brake arrangement is constructed with "Y"-shaped brake hangers, and the brake levers, as shown in the illustration at bottom of page 516, are made without offsets. The construction employed gives two bearing points at the top of the hanger where it is suspended from the gusset brackets and prevents lateral movement of the head and shoe. This insures proper alignment between the shoe and wheel. It will be seen from the illustration that no brake beams are used, and the arrangement of levers produces a straight action in the whole brake mechanism which is designed to eliminate the possibility of excessive piston travel resulting from slack. The levers are equipped with large diameter hardened steel pins, which are made with a driving fit so as to avoid looseness and prevent noise in service. The truck side frame is made of wrought parts bolted to cast-steel pedestals, which are carried on the journal boxes by graduated springs.



Design of Automotive Drive Applied to Experimental Car in Paris. Motor Is Mounted Longitudinally on Car Frame and Drives Through Shaft and Universal Joint

The development work being carried on in Minneapolis represents a considerable departure from existing truck construction methods. The two outstanding innovations in this type of truck are, first, the use of automotive-type band brakes, arranged with one brake drum on each axle at diagonally opposite corners of the truck, and second, the placing of journal boxes inside of the wheels for the purpose of narrowing up the entire truck structure and therefore reducing its weight. In addition to these two departures the axles are being bored throughout their length to reduce weight. This practice is said not to materially affect the strength of the axle.

A considerable number of trucks of the type just described have been in service in Minneapolis for a long time with apparently satisfactory results. The band-brake construction is said materially to decrease noise and chattering of brakes in service and in addition eliminates a considerable amount of wear on wheels. The entire truck structure is made as light as possible, utilizing high-grade heat-treated steel wherever practicable. The development work is still going forward and some of these trucks have also been equipped with roller bearings in the journal boxes.

The idea of boring out axles is being tried by other operators and if the cost of boring is not found to be excessive for the advantages obtained, the practice looks well worth considering.

CONSIDERABLE PROGRESS MADE IN TRUCK SPRINGS

In the development of modern cars and trucks an increasing amount of attention is being given to the subject of truck springs. Appreciation of the importance of easy riding cars from the standpoint of good merchandising, together with a gen-

(Continued on page 536)

Important Economies to Be Had in Greater

Interchangeability and Standardization

More Standards Make Fewer Parts

The cost of car maintenance over a long period of years is as important as if not more so than first cost. To obtain the advantage of standardization in the purchase of stock cars all the various forces in the industry would have to be organized to produce one or more models having interchangeable parts. By the adoption of standardized repair parts on its own property for all of its equipment and adherence to association standards for manufactured parts, each railway property can make large individual savings and at the same time support the common cause. Competent engineering organizations are required for this program

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PARTICULARLY since the advent of the automotive industry, electric railway operators and car builders have been confronted with the somewhat disconcerting object lesson of what great economies can be accomplished by standardization of parts and manufacture of vehicles on a quantity production basis. This inspired much talk about the development of a standard railway car whose manufacture could be carried out by automotive manufacturing methods. Out of this came the Birney safety car as the first attempt to build cars that would be purchased off the sales room floor as is. The pressure of financial necessity overcame the reluctance to relinquish individualism in design and the car was widely adopted and put to successful use.

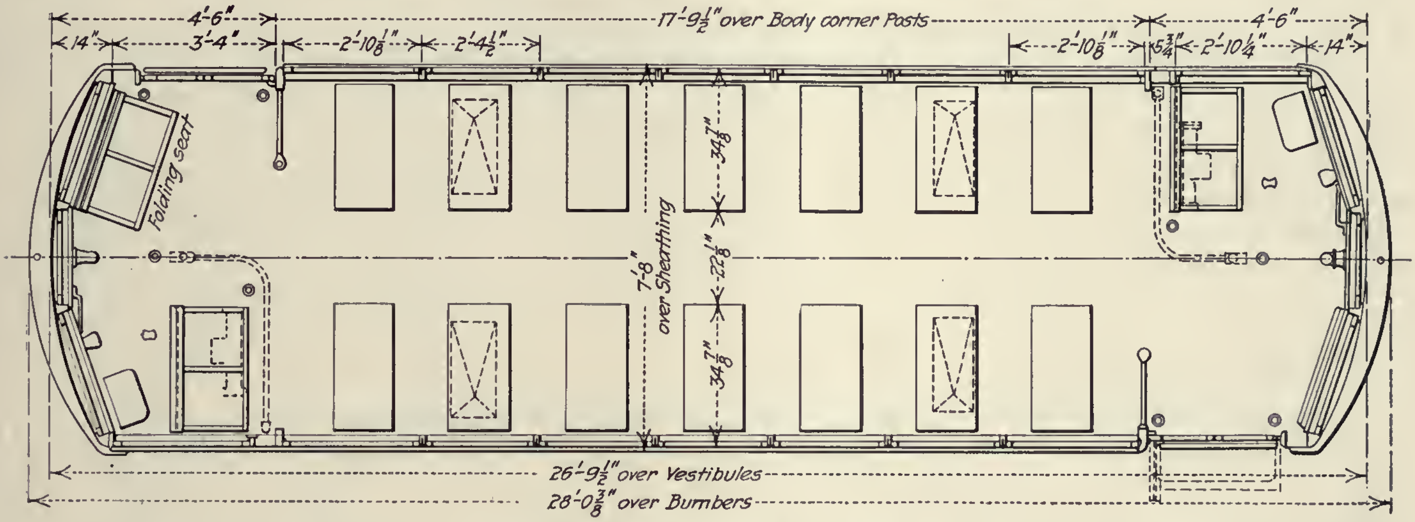
But the circumstances under which this "stock car" was put out to the railway field involved certain fundamental differences from those surrounding the manufacture of automobiles. With automobiles, and to a certain extent with buses and trucks, the purchaser is an individual, or at most the owner of only a comparatively small number of vehicles. The manufacturer is able to show certain complete designs manufactured on a quantity production basis at an attractive selling price, and the purchaser selects the vehicle which suits his requirements best, just as it is delivered to the sales floor. The useful life of the car is comparatively short and maintenance parts are required for only a comparatively short period. Standardization is carried out on only a very few types. The great majority are changed in design from year to year. The economies obtained in manufacture are the result of the production of an enormous number of vehicles each year which are built exactly alike and sold "off the shelf."

In the case of electric railway cars, an entirely different condition exists. Here the car is purchased by a large operating organization which is engaged in the business of transportation and which therefore has preferences in regard to certain types of design and construction for particular service requirements. The factors of life of the vehicle and cost of maintenance are given very serious consideration, and the design of the car is carefully specified in accordance with the ideas and experience of the engineers and officials of the operating company. These cars are designed for continuous operation over a long period of years. Although very substantial savings in first cost would be made by accepting cars built by manufacturers for stock, the items of maintenance and operating cost are of paramount importance.

Cars purchased from different manufacturers require entirely different maintenance parts. Assuming for a moment that it were possible to carry out the extremely difficult organization problem of obtaining universal acceptance of one or even ten different models of cars, all the forces of progress would be against the maintenance of such standards after they were once adopted. An industry which does not move forward will move backward. The constant development of ideas is the natural result of increasing experience. Failure to put these ideas into practice will result in stagnation and ultimate degeneration. The public looks for and demands progress. Almost any change from that to which it is accustomed is frequently accepted as progress, whether or not such is actually the fact. The popularity of the motor bus in some places under conditions where actual physical comfort and safety are inferior to those furnished by rail vehicles may be largely attributed to this cause.

There is an additional difficulty in the establishment and maintenance of standard car models. The competition among manufacturers striving to improve their products and decrease their costs would quickly tend to develop new designs or models for "stock" cars. As between the cars manufactured by various car builders, standardization of dimensions, arrangement and general construction have little if any advantage from the standpoint of maintenance. It would be only by the accomplishment of complete interchangeability of mill parts, castings, forgings, trimming material, truck parts, and miscellaneous mechanical and electrical equipment between the cars manufactured by the different builders that any advantage from the standpoint of operation and maintenance could be obtained.

Consequently, when the reason is examined for the apparently increasing sentiment in favor of changing in some one element or another the Birney type of one-man single-truck safety car, an underlying cause of the lack of continued approval of this car in its original form is found to be not only the general tendency toward improvement, but also the fact that this car, with the exception of giving lower first cost due to quantity production, did not fulfill many of the other requirements of a standardized car. Not only was the car built by each manufacturer an entirely different and distinct unit so far as the miscellaneous maintenance parts are concerned, but in the cars built by different manufacturers there are at least three different sets of dimensions. At no time during its history did this car ever approach a stage in the development where an operator purchasing the same type of car from different manufacturers was able to obtain in any sense an interchangeable car. It is also obvious that to obtain such interchangeability would present a very serious organization problem indeed.



Standard Type of Birney Single-Truck One-Man Car Has Seating Capacity of Thirty-two with Full Cross-Seat Arrangement

In spite of the above described difficulties in the path of obtaining standardized cars, there are opportunities in electric railway practice to effect very important economies through application of the principles of standardization. This can be partly accomplished by the adoption, as far as the requirements for progress will permit, of standardized types of vehicles on individual properties. This of course is possible only on the larger properties. With this practice carried out, however, the smaller properties would not be at a disadvantage, because car builders would be in a position to furnish duplicates of the standard cars of any of the larger properties. Even under present conditions, the smaller property purchasing a limited number of cars usually selects a design which has been prepared for a larger order.

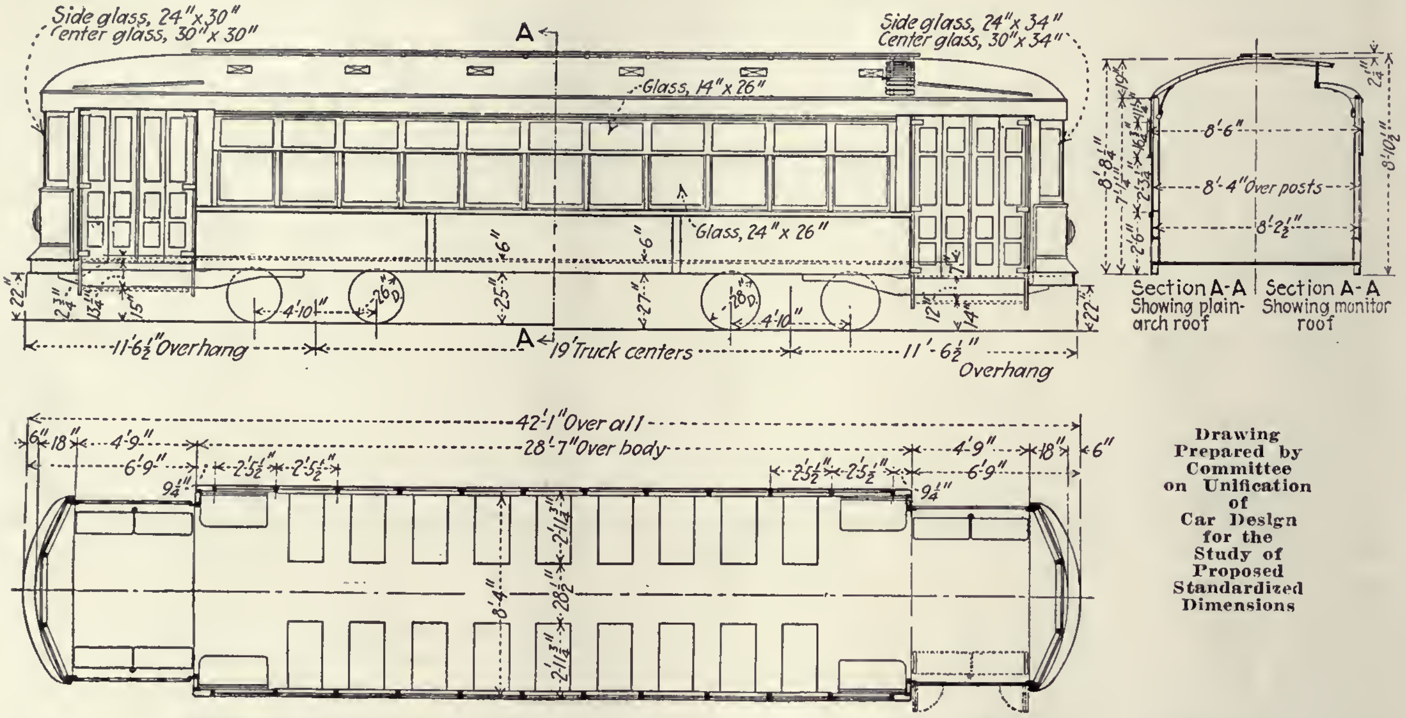
A still more important step in obtaining the advantages of standardization can be made. This consists in the adoption of standardized construction details and interchangeable maintenance parts. Here is the opportunity for an important advance in practice by most properties, and for effecting very material savings in maintenance costs. Even for different designs and models of cars there are almost innumerable parts that can be made interchangeable. Large reductions in the stock of parts on hand and in the cost of pattern equipment would be made. In addition, there would be a saving in time and cost and the elimination of a great deal of wasted effort in the purchase and transportation of maintenance supplies. The possible savings include not only the cost of repair parts but also the elimination of many delays in the repair of equipment while special parts are being made or purchased.

ENGINEERING ORGANIZATION REQUIRED

After a careful study of the equipment on a property and the institution of a definite program along these lines, the problem becomes one of careful supervision. This calls for the organization of carefully trained engineering organizations in the equipment departments of operating companies. The personnel of such an organization should not only be competent to analyze the requirements and select standards, but also, by the preparation of specifications and inspection of incoming materials, assure the maintenance of such standards after they are adopted. By a check on the activities of maintenance forces in carhouses and shops, it should prevent unwarranted deviation from established standards in the manufacture of repair parts.

Standards of the type discussed may be established for a great variety of parts. Door and step mechanism parts, foundation and hand brake rigging, grab handles, folding seat parts, gongs and bells, fender parts, register operating mechanism, hand strap brackets, draw bars and heads, catches, locks, door handles and miscellaneous items of trim, motor junction boxes, wiring fittings and many other parts come within the classification of parts to be standardized. But there is an even wider application for this practice. The dimensions and design of posts, doors, sash and a multiplicity of wood mill details offer many possibilities for standardization even when used on entirely different types of cars. This would reduce the number of parts to be carried in stock and effect important savings in maintenance costs.

In the design of new equipment it is possible to apply a great many existing standard parts. With a competent engineering organization available, it is also possible to assure the use of standard methods of construction by furnishing detailed drawings of cars. In recent cars built for the Chicago Surface Lines this practice was carried out, and cars built in three different plants were completely designed by the operating organization to include entirely duplicate parts and construction details. A great many parts already standard on the property were applied in the construction of these cars, and consequently maintenance parts were in stock when the cars were received and the necessity for augmenting existing stocks by the addition of a great many new parts was eliminated. Under the usual conditions existing on most properties, these new cars would have required three entirely new sets of parts, one for each group built in a different plant.



Drawing Prepared by Committee on Unification of Car Design for the Study of Proposed Standardized Dimensions

In the development of steam railroad rolling stock equipment, there is one automatic checking condition which has been primarily responsible for the very much wider degree of standardization and interchangeability, which is found in the rolling stock equipment of the steam roads, as compared with the electric railways. This is the necessity for interchangeability of equipment and the repair of equipment on foreign roads. Through the activities of the American Railway Association a great deal of progress has been made in standardizing the more important parts made by various manufacturers.

GREATER ADHERENCE TO ASSOCIATION STANDARDS REQUIRED

Marked progress along these lines has also been made by the electric railway industry as a result of the work done by committees of the American Electric Railway Association. Active interest and participation in this work by all operating companies is necessary for the accomplishment of further standardization. Also greater degree of adherence to these standards by operating companies will result in substantial savings in manufacturing and maintenance costs.

The A.E.R.A. is just now engaged in the work of a thorough revision of its standards and is also revising its manual for the purpose of eliminating superfluous material and making it what it should be—an authoritative guide to the standards set up by the various committees of the association after a very careful study of the practice on various properties. It is to be hoped that this revision of the manual may be made the occasion for fostering a closer adherence to these standards on the part of operating companies. In the case of rolling stock equipment especially, non-adherence to association standards is particularly evident, and it is very important, if the advantages of standardization are to be obtained, for each individual property to co-operate in the general task of submerging its own particular ideas by the adoption and adherence to association standards where these can possibly be applied to its property.

Our industry has seen and has talked but has been exceedingly slow to relinquish individualism for the common good by an active campaign of support and adherence to association standards. It is only by this policy that the advantages and economies resulting from standardization can be obtained.

In this same connection, it is imperative that committee procedure in the association be so carried out that regularly adopted standards will not be arbitrarily and frequently changed. It is only for the purpose of obtaining the advantages of some real basic development or a very marked and evident decrease in cost or improvement in performance that a regularly adopted standard should be changed. Nothing will destroy the confidence in association standards, or prevent their widespread adoption by operating companies, quicker than the practice of indiscriminately changing these standards in accordance with the ideas of various members of standing committees as the personnel of these committees changes from year to year.

UNIFICATION OF CAR DESIGN AN IMPORTANT STEP

The work started by the committee on unification of car design is also a step in the right direction. Studies for the purpose of establishing certain groups of dimensions for car widths and heights, post centers, seat widths, door openings, etc., are in the direction of obtaining greater uniformity in practice.

An accompanying drawing gives the dimensions and car arrangement prepared by this committee, which shows the type of body standardization that can be successfully carried on by the association. Another drawing showing a floor plan of the Birney type of single-truck one-man car is published here for comparison with the changes in design which have been discussed in preceding chapters.

Incorporating

Merchandising Features in the Design

Cars that Make You Want to Ride

Streamline bodies are helpful in getting good appearance. Good painting is extremely important, and here is told how to get the best results in color and protection. The kind of seats used and the interior trim and finish have much to do with making the ride a pleasure. Some new ideas in this direction are pointed out

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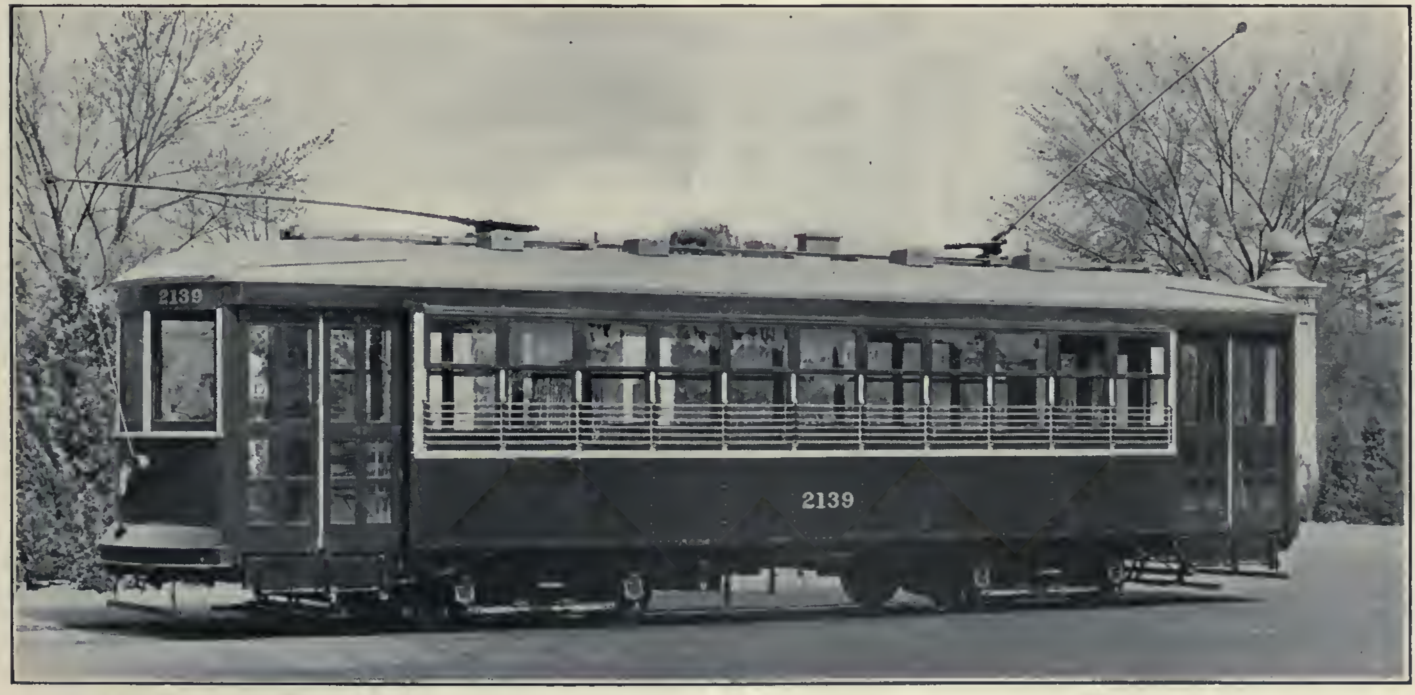
THE effect of car design in selling transportation is twofold. The outside appearance of the vehicle should be such as to invite one to ride, and the interior arrangements should be such as minister to the comfort and convenience of the passenger in every practicable way. An attractive car exterior will stimulate in the man on the sidewalk a desire to ride, and a pleasant, quiet, comfortable trip will encourage the passenger to repeat his journey. By giving careful attention to these matters, many electric railways are regaining some of the non-necessity riding.

In connection with the exterior appearance of the car, the body lines are of primary importance. In early car construction curved sides were the almost universal practice, but subsequently, with the advent of the steel car, a straight side came into vogue. More recently, however, there has been some tendency to return again to the curved side design. Among the examples of this are the cars of the Kentucky Traction & Terminal Company, those of the City Railway of Dayton, the new cars of the Cincinnati Traction Company and those built for the Youngstown & Suburban Railway and others. Whether or not the curved side presents a more pleasing appearance than the straight steel side is largely a matter of taste. With a single-truck car, or with a double-truck car having a comparatively short body, a curved side seems to prevent the vehicle from having the dumpy appearance sometimes resulting from short flat surfaces.

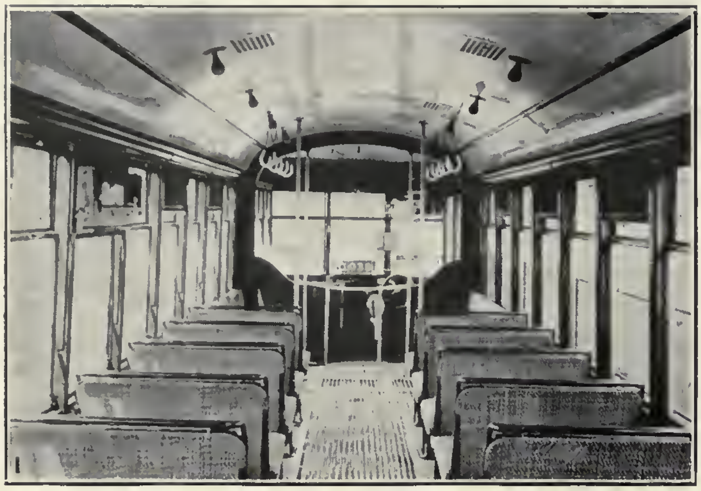
Closely connected with the matter of body lines is the design of the roof. In recent construction the old-fashioned monitor roof has almost entirely disappeared, nearly all of the more modern cars being built with arched roofs. There can be no question but that the latter gives the vehicle a more graceful appearance than can possibly be achieved with the former. There is opportunity for considerable display of skill on the part of the car designer, however, in getting a graceful curvature of the roof and adapting it to a particular car body. Two practices are in common use. The ends of the arched roof may follow a short radius curve in changing from the horizontal to the vertical or may follow a flat parabolic curve. The latter practice tends to accentuate the stream-line idea.

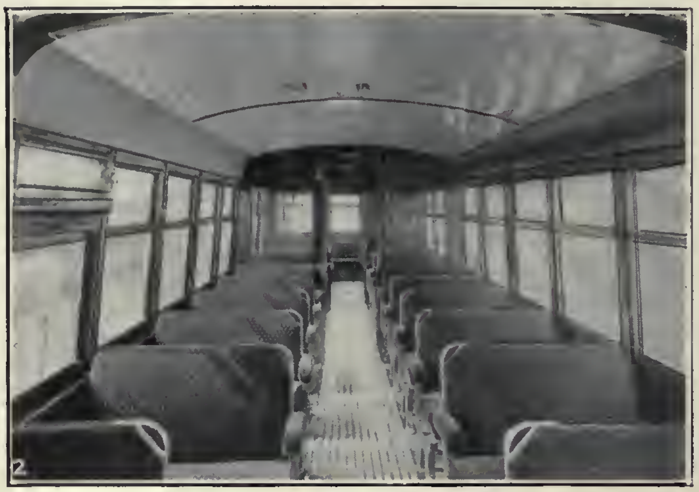
It is a well-established fact that long continuous lines from end to



A Modern Car of the United Electric Railways, Providence. It Is Painted Dark Green and Trimmed with Very Light Green

These Cars Show Various Ideas in Merchandising Transportation





1.—Cross-seats have grab handles extending the entire length of the back in the new cars of the Kansas City Railways.

2.—The light-weight interurban cars of the Kentucky Traction & Terminal Company have upholstered arm rests.

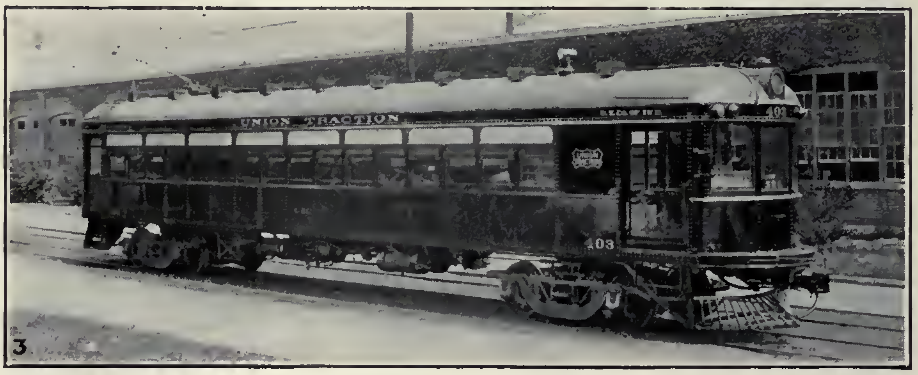
3.—The Union Traction Company of Indiana has realized upon the merchandising value of this type of all-steel coach.

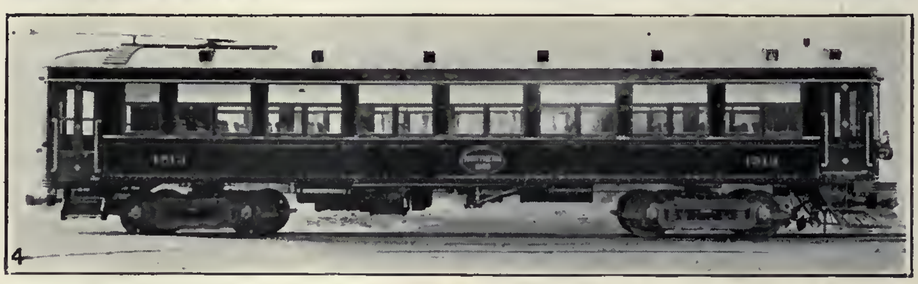
4.—In exterior appearance the high-speed interurban car of the Northern Ohio Traction & Light Company rivals the best steam railroad cars.

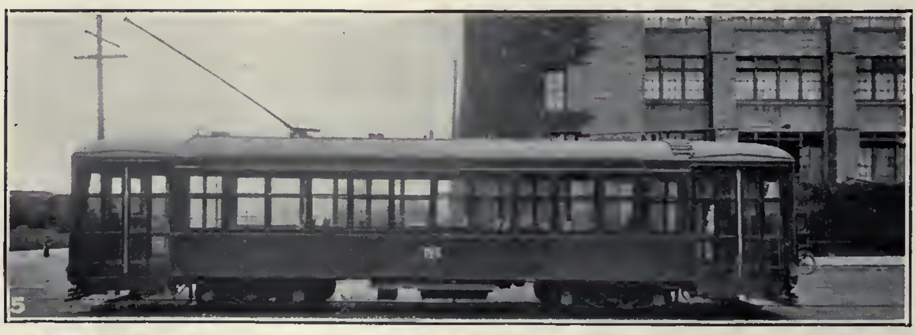
5.—The monogram of the Muskegon Traction & Light Company is the only decoration on this attractive car. This practice is being widely adopted.

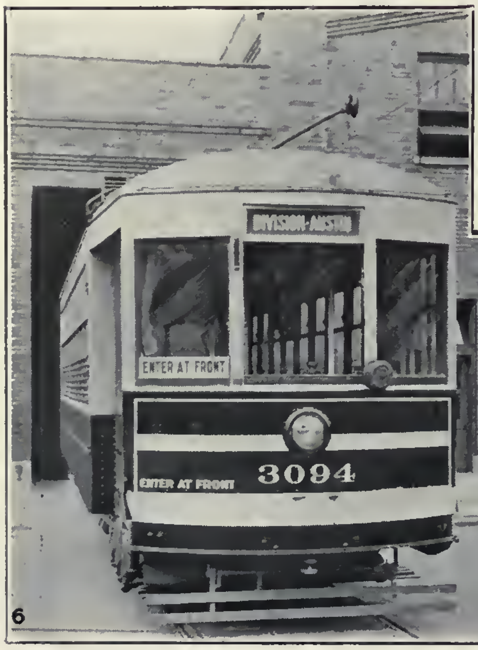
6.—A broad aluminum band across the dasher is used by the Chicago Surface Lines to designate a front-entrance car.

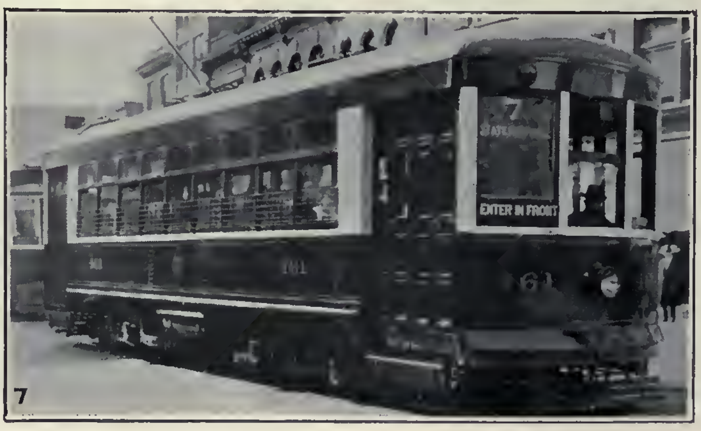
7.—Frequent and careful car painting increases the popularity of the Binghamton Railway.











end of the car body produce a much more pleasing result than is created by short broken lines. This principle, which has been so successfully applied in the automobile industry, has been borne in mind in the body design of many recent cars. A vigorous attempt has been made wherever possible to bring short horizontal lines to a uniform height. The platform windows are at the same level as the windows in the car body, giving the artistic effect of continuous lines. This cannot always be done, however, because the size of the controller may have to govern the height of the dash. The tops of the entrance and exit doors and tops of the windows in the car are at the same level. Moreover, the lines along the bottom of the car body are made continuous wherever possible. The result of such an arrangement is to emphaize stream lines and it is pleasing to the eye.

PAINTING FOR APPEARANCE AND PROTECTION

Painting is an influential factor in the effect created by the car exterior. The predominant color is a matter of extreme importance and deserving of the greatest care in selection. Moreover, the striping and decorating can either make or mar the appearance of the vehicle. Among all the available colors, only six are widely used by the railways in this country. These are Pullman green, Traction green, Tuscan red, a red half way between carmine and vermilion, orange, and yellow.

Although the entire subject of painting cars is more or less in a developmental stage at the present time, a few general principles can be set down. Painting is carried out for two distinct purposes, namely, to secure a pleasing appearance and to protect the car structure from the elements. Each of these considerations must be given its proper weight in selecting colors. It is poor merchandising to use any paint, no matter how attractive in appearance, if its life is so short that it becomes impracticable to maintain it in good condition. Durability must therefore influence the selection of colors, even from the merchandising standpoint, and then the protection of the structure will be automatically taken care of.

Paints vary greatly in the matter of durability. The so-called natural colors, which are made from various earths and metal ores, are unaffected by long exposure to sun and rain. Artificial colors, on the other hand, are made synthetically from chemicals, especially from coal tar, and are generally less durable than the natural colors. Modern methods of manufacture, however, have been improved to a point where many artificial colors are sufficiently durable for all practical purposes.

Painters classify colors in seven groups: Black, brown, blue, green, red, white, yellow. The black group are practically all composed of pure carbon and are therefore indestructible. They are very useful to the car painter for certain parts of the equipment, but of course have no value as body paints. The brown group, which are derived from raw umber, are fairly permanent, but brown is not an attractive color for cars and is seldom used.

Blue colors are all artificially made except a few very high-grade and extremely expensive paints which are manufactured from lapis lazuli. Those which are made chemically are susceptible to sunlight and fade quickly. For this reason they are of little value to the car painter. Green paints are generally produced by a combination of blues and yellows. The presence of the yellow makes green a more durable color than pure blue. For the same reason, light greens retain their original luster longer than do dark greens.

All red paints become dingy with age. The basic ingredient of these colors is the red oxide of iron. The natural state of this oxide, however, is in the hydrated form, which is yellow, and the red oxide tends always to change into the yellow hydrated form. Hence red paints invariably lose luster as they grow older.

Yellows may be divided into two main groups: Yellow ochre and chrome yellow. The former is a natural color whose chief ingredient is the hydrated oxide of iron already mentioned and is practically permanent. Chrome yellow, on the other hand, is a chemical color derived from lead chromate and is not very durable.

Colors of the white group are derived from earths, of which decomposed lime rock is the most important, or from oxides of lead and zinc. Their chief utility in car painting, however, is for the interior of the vehicle, for limited exterior trimming, or for mixing with other colors to brighten their tones.

It will be seen, therefore, that from the point of view of durability the natural yellows and oranges are good colors for car painting. Visibility is another advantage claimed for them. Reds also are natural colors and are fairly permanent, although in time they always fade somewhat. As a combination of durability and pleasing color, however, red should rank high with the car painter. Greens are less permanent than yellows and reds, but the lighter shades last well enough for most purposes.

SINGLE COLOR FOR ENTIRE CAR BODY

In recent painting practice the use of a single color for the entire body predominates. When this is combined with a harmonious secondary color for trimming, the result is very pleasing. The effect thus achieved is generally more satisfactory than when two principal colors are used. For practical reasons the letterboard should be painted a dark color. Unless this is done the dirt which accumulates on the roof will be washed down by the first rain and the letterboard will soon present a grimy, streaked appearance.

A second principal color, lighter in tone, is sometimes used on panels below the wagon rail on the older curved-side cars. This effect is usually not so pleasing as when one solid color forms the background for the entire car. It is important, however, that where only one principal color is used, the striping and decorating be harmonious in color and tasteful in design. In other words, there must be more trim when only one main color is used.

Paint may be utilized to good advantage in emphasizing horizontal lines or in correcting breaks in the lines of the structure which are due to unavoidable mechanical requirements. To accomplish this, striping on the sides of the car body has been continued at the same level on the platform and dashers. When the body and platform windows are at the same level, the trimming around them presents another opportunity for the painter to make a continuous line of color. A problem sometimes arises due to the platform posts running between the roof and floor. There is no natural division on these posts and the tendency is therefore to paint them a uniform color from top to bottom. As this is usually the lighter of the two colors, it creates a prominent vertical line which detracts from the streamline effect. Posts should be painted to conform to the adjacent portions of the car body.

Roof colors are sometimes the same as the lighter of the two colors used on the body, but they are more often neutral shades of gray or brown. An important consideration in connection with roof painting is that too many colors introduced into the design spoil the effect. If the roof is painted in a color that is used elsewhere on the car, or in some neutral tint that does not attract the eye nor present a sharp contrast to the rest of the painting, the result is satisfactory.

Besides outlining the window frames in some lighter color in the way that has already been described, it is the practice of most companies to decorate the sides of the car body with various sorts of striping. A particularly pleasing combination is an aluminum stripe on a light green background. Gold or aluminum striping on a red background usually looks well. Simplicity is a great virtue in this matter. A single stripe forming the perimeter of a rectangle on the side of the body has been widely adopted and is probably as satisfactory a design as can be found. When stripes are used on the dash they should line up with the body striping whenever possible, even though there may be some difference in height between body and vestibule belt rails.

Special painting is occasionally used for informative purposes. An example of this is the practice in Philadelphia, where all front-entrance cars are painted Pullman green, in contrast with the rear-entrance cars, which are bright orange. The purpose of this arrangement is, of course, to inform waiting passengers which type of car is approaching. The Chicago Surface Lines accomplishes the same object in a slightly different way. Its front-entrance car is differentiated from other types by the presence of a broad aluminum band across the front dasher. The body color being red, this aluminum band stands out prominently and attracts attention to the fact that it is a front-entrance car.

Some railways have a habit of painting short legends on the exterior of their cars. "Have Exact Fare Ready," "Enter by Front Door," and other similar signs are not infrequently to be found lettered on the outside of cars. It may be doubted if this is the best way to accomplish the desired end. Such lettering certainly detracts from the appearance of the car and many companies have found it more satisfactory to convey the desired information by means of small signs in the windows. The latter plan probably makes the message more conspicuous.

For many years it was common practice among electric railways to display the name of the company prominently on the sides of the cars. Although this practice is still followed in a number of localities, it no longer has the vogue which it formerly had. In fact, many railways have gone to the opposite extreme and now have no indication of ownership on their cars. A happy medium appears to have been struck, however, by those companies which place on the sides of their vehicles an attractive monogram in the same color as the striping. This serves both to relieve the monotony of a plain side and also to acknowledge to the public the ownership of the car.

The requirements of economy sometimes clash with the requirements of merchandising transportation in the matter of car painting. That, of course, is an issue which each railway must decide for itself. If economy is to be the sole criterion, then the company should not deceive itself that at the same time it is achieving an artistic success.

The financial benefit from the introduction of special merchandising features in the car painting program is very difficult to measure. Such a step frequently forms but a part of a larger merchandising program on the part of the railway, and there is no way to determine which particular feature has appealed to the public and has brought about increased riding. However, it has been the experience of numerous railways which have replaced dull exterior car colors by lighter, brighter tones that the public has been quick to notice the change and has been warm in its praise of the improved appearance of the cars.

Small items often affect the exterior appearance of the car. The modern lifeguard which is partly concealed below the floor of the platform gives a much trimmer look to the car than do the various types of fender which extend out in front beyond the bumpers. The improvement is particularly noticeable in the case of double-end cars which require fenders or lifeguards at both ends. The rear fender when folded up usually detracts from the neatness of the car appearance.

The new cars of the Brooklyn City Railroad are equipped with wagon buffers. These are raised vertical strips of rounded metal at the corners of the car body and beside the center doors. They are intended to prevent other vehicles from scraping off the paint along the car sides.

Destination signs, in addition to facilitating rapid loading of cars, play an important part in selling transportation. The prospective passenger who can readily determine where the car is going may ride the car instead of taking a taxi. Considerable skill has been displayed by the car builders in locating destination signs where they do not detract from the exterior appearance of the car. This can be done as the accompanying illustrations indicate without breaking the continuity of body lines. The Detroit car pictured on page 484 is excepted in this statement.

MAKING THE INTERIOR PLEASING

Probably the most important merchandising feature of the car interior is the seating arrangement. There is no question that passengers prefer cross-seats to longitudinal seats. In spite of the fact that the total carrying capacity of the car is reduced by this arrangement, nevertheless most railways have adopted it in their newer cars. In the pay-as-you-pass car, which is becoming increasingly popular, a combination is effected between longitudinal and cross-seats, the forward half of the car being fitted with longitudinal seats and the rear half having cross-seats. This arrangement appears to be entirely satisfactory inasmuch as the passenger has his option of the two plans and the more desirable cross-seats invite him to pay his fare when he gets on. The number of cars recently built with only longitudinal seats is so small that this arrangement may now properly be called obsolete or at least behind the times.

A foot rest is an important detail which adds to the comfort of a passenger riding in a cross-seat. Upholstered arm rests on the aisle side of cross seats have been installed on some recently built cars. While they look attractive and add to the comfort of the passenger while sitting, they make ingress and egress more difficult. Any arm rest tends rigidly to limit the seating area. In interurban service, therefore, arm rests have advantages, but in city service they are undesirable. In some new cars the cross-seats have grab-handles extending along the entire length of the back. The car of the Kansas City Railways is an example.

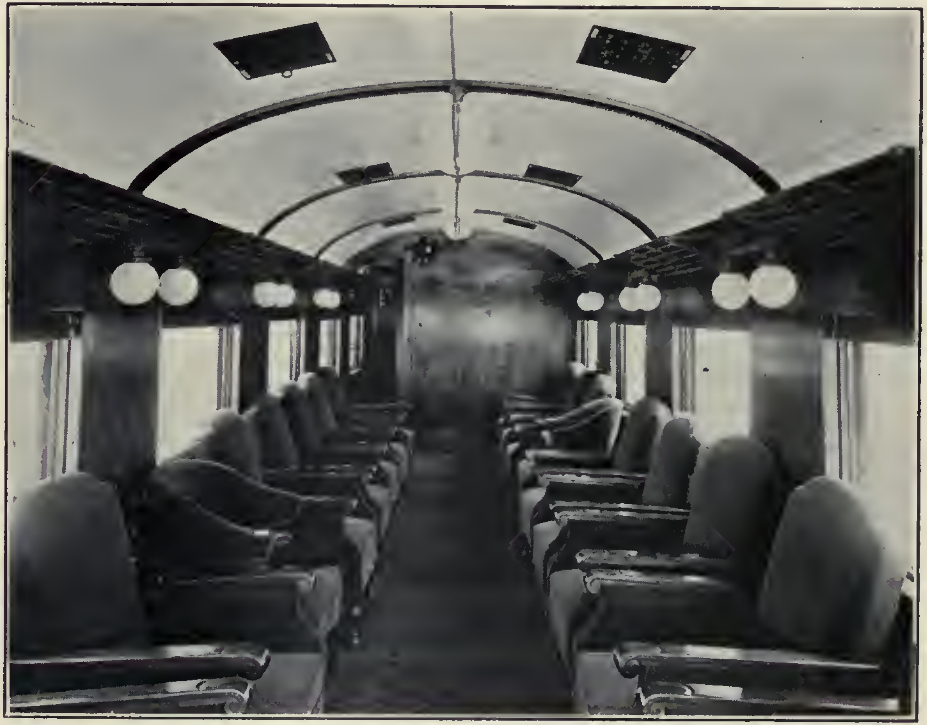
This is no doubt an added convenience though not essential. But where this device is not used, at least the usual type of handhold at the aisle end of the seat back should be provided.

In regard to the proper material for seats there is still diversity of opinion. Some railways cling to wooden slat seats. It is claimed that short-haul passengers do not care upon what material they sit, and the sanitary and economic advantages of wooden seats dictate their use. Rattan-covered spring seats, however, are today rather more widely used, and wisely so, than are the wooden seats. In some cases the former have spring backs, but some railway men think that the springs in the seat back are of less importance than its shape, which should closely conform to that of the human body. However, there is much to be said in favor of the spring back for its cushioning of the shocks of starting and stopping.

In an endeavor to improve the merchandising value of new cars a few properties have turned to the use of mohair plush upholstered seats. These installations have usually been made on interurban lines, but seats of this kind have in a few cases been installed in cars for city service. Various fabrics, mostly in imitation of leather, have also been tried as seating material. From the standpoint of sanitation, first cost and maintenance expense, the use of these materials is a questionable practice for city service. Furthermore, there is some basis for doubt as to whether the main value of their use has not been more a matter of improved appearance than actual increased comfort. The possibility of getting the same pleasing effect without the drawbacks of the more expensive materials by staining the ordinary rattan in some attractive shade of gray, brown, mahogany or green does not seem to have been given much consideration. Judging from the effects produced with wicker household furniture stained in various colors, the prospect of applying the same idea to rattan car seats is worthy of some thought and experiment.

Several suburban lines have built cars with individual chairs. The Lehigh Valley Transit Company operates a parlor car with wicker chairs on its "Liberty Bell" route between Allentown and Philadelphia. A combination parlor and buffet car is run on the Chicago, Aurora & Elgin Railroad. For luxuriousness and comfort the observation parlor cars of the Chicago, North Shore & Milwaukee Railroad is not excelled by any other vehicle.

The question of step height, which is an important one from the viewpoint of selling transportation, is discussed more fully elsewhere in this issue. In general it may be said that anything which decreases the climb of the passenger and makes it easier for him to board the car may properly be classed as a desirable merchandising feature. Methods of facilitating passenger movement in the car have distinct merchandising value. Entrance and exit arrangements, location of doors and bulkheads, the position of fare box and railings all affect the comfort and convenience of the passenger. Any unnecessary obstruction to his free movement should be avoided. These items, however, are discussed at length in another chapter.



The Luxurious Interior of the Observation-Parlor Car of the North Shore Line Is a Most Valuable Merchandising Asset. Its Exterior Is Likewise Inviting

FEATURES DESIRABLE IN INTERIOR TRIM

No particular recent changes are noticeable in the method of treating the interior woodwork of the car. Cherry and mahogany stains predominate now as heretofore. The new interurban cars of the Pennsylvania-Ohio Electric Company have interior woodwork made of African mahogany. More attention is also being given to the matter of metal trimmings. Statuary bronze, aluminum and various alloys are being used for this purpose with good effects.

It is now almost universal practice to paint the headlining a light color. In some cases pure ivory white is used and in other cases the color is a cream or light buff. Blues and greens, which were at one time popular, are now entirely dispensed with. The reason for this, of course, is the desire to brighten up the aspect of the car interior as well as to provide a better reflecting surface for the electric illumination at night. For the creams and buffs it is claimed that nearly as much light is reflected as is the case with a pure white, whereas the maintenance cost of the former colors is much lower and they look better than dead white.

The questions of lighting, heating, and ventilating are important ones, from the viewpoint of selling transportation. Each of these, however, is a problem by itself and deserves careful consideration. Details of developments in these subjects are given in another chapter.

In line with the other efforts to make the interior of the car more attractive to the passengers, linoleum is being used for a floor covering to a limited extent in interurban service. This has been done even on cars recently rebuilt, such as those of the Tri-City Railway, which paid particular attention to merchandising features. In a few cases, primarily on interurban cars, grass carpet strips are used and even plush carpet.

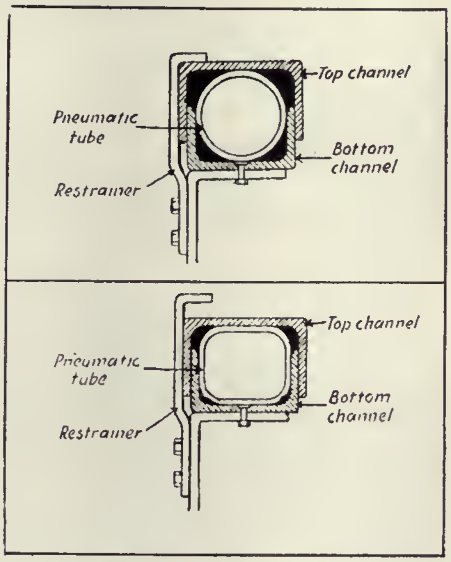
Stanchions, grabhandles and straps are still used in much the same way that they have always been used. The general practice today, however, is to utilize white enameled metal, aluminum or composition materials for these purposes. This is a practice which greatly improves the appearance of the car interior. The straps in many of the new cars are suspended directly from the roof. The old-fashioned rod from which the strap hung, and which ran from end to end through the car, is no longer in general use. Occasionally, however, grab rods have been substituted for the straps, and the latter have been done away with altogether.

One of the most important recent tendencies in car designs, so far as the impression created in the mind of the passenger is concerned, is the elimination of unnecessary paraphernalia inside of the car body. This tendency is clearly shown in several of the cars illustrated in this chapter. The straps are supported directly from the roof as already mentioned. The bell cord runs through a tube inconspicuously placed. Register rods have been either eliminated or else carefully concealed. Apparatus has been so located that it is inconspicuous. Some railways have even gone so far as to remove the advertising racks and placards inside the cars. This particular idea may not find wide favor, but nevertheless the general plan of simplifying the car interior, and eliminating every unnecessary device, has improved the vehicle very much from a merchandising standpoint.

There is a tendency to use better quality glass for car windows, even plate glass in some cases. This is all in line with the general policy of improving the appearance of the vehicle wherever possible.

Metal window posts are popular and there have been developed several spring slides for the window sash so that the window is held firmly and does not rattle. Closely spaced catches on the window posts are more convenient for the passenger and also safer, because there is less danger of the sash falling on his arm. Another advantage of the metal window posts, particularly the spring equipped type, is that there is less tendency for windows to stick than with wood posts.

Noise reduction in the operation of electric railway cars is being studied. Interesting investigations along this line were recently made by the London Underground Railway. It was found there that the noise can be divided into three classes, namely, that from wheel and rail shock, the rattling of brakes and other apparatus under and on the car, and motor and gear noises. Although such noises are particuarly disagreeable in the inclosed space of an underground tube, even in the open they also detract greatly from the pleasure of riding in an electric railway conveyance. Among the recommendations made by the investigating engineer in London, which would doubtless prove useful on any electric railway property, are the following: The use of fiber or fiber-supported wheels, increased length of springs, lubrication of springs, the use of stiff, double sides, and packing of the entire side wall space with sound absorbing material like slag wool or asbestos compound. After the London tests it was recommended that the wheels and all parts below the stepboards be heavily shrouded to deflect the sound. This of course appears to be a difficult matter to carry out on surface cars. A double flooring with $\frac{1}{8}$-in. asbestos or felt between the thicknesses was also recommended. It was found that the floor was not such an important factor in the transmission of sound as were the sides and roof of the car. An unusual point mentioned in the report of the tests was that cross-seats have a tendency to reduce the noise inside the car by breaking up the sound waves.



A Pneumatic Supporting Arrangement for Single-Truck Car Bodies

Another interesting British experiment is a pneumatic supporting device for the body of single-truck cars. This is accomplished by means of two pairs of steel channels, one fixed to the body proper and the other bolted to the truck. Inside of the square space formed by these two channels is an inflated rubber tube. The device operates by shock dispersion, as any shock received by the truck is distributed over the whole body through the elastic medium of the air cushions. The wear on the tube is said to be almost negligible.

VALUE OF OPEN CARS

One method of encouraging non-necessity riding that has in the past proved very successful is the use of open cars in summer. Due partly to the cost of changing over equipments and partly also to the greater accident hazard, many railways have abandoned the use of this type car. Those which still use it, however, are practically unanimous in the belief that it stimulates the riding habit. In Los Angeles, a combination car has been in service many years, the center part of the body being closed and the ends being open. Street railways in New York City and New England operate many convertible cars in which the panels between the window posts are removable for summer, and may be inserted during the winter. At the present time, few railways are willing to tie up money in unproductive equipment and hesitate to undertake the additional investment necessary for providing cars that could be used only during a few months of the year. For this reason it appears that development in the direction of open-car operation is necessarily limited to scenic routes where pleasure travel may be stimulated by their use. It has been suggested that a satisfactory solution of the question could be found in the Los Angeles type car, with panels possible of insertion between the posts in the open sections. Such a car would be quite suitable for either summer or winter operation.

From the viewpoint of selling transportation, it is not desirable that a car should remain in service too long. No matter how carefully we overhaul and remodel an old car, it always remains an old car. It is impossible to conceal the fact from the riders, and they recognize the car for what it is—an old-style vehicle. It stands out in painful contrast to every modern car operated. In considering any car rebuilding program, therefore, the advantages of new cars from the merchandising standpoint should be given due weight.

Cars for Use in Train Operation

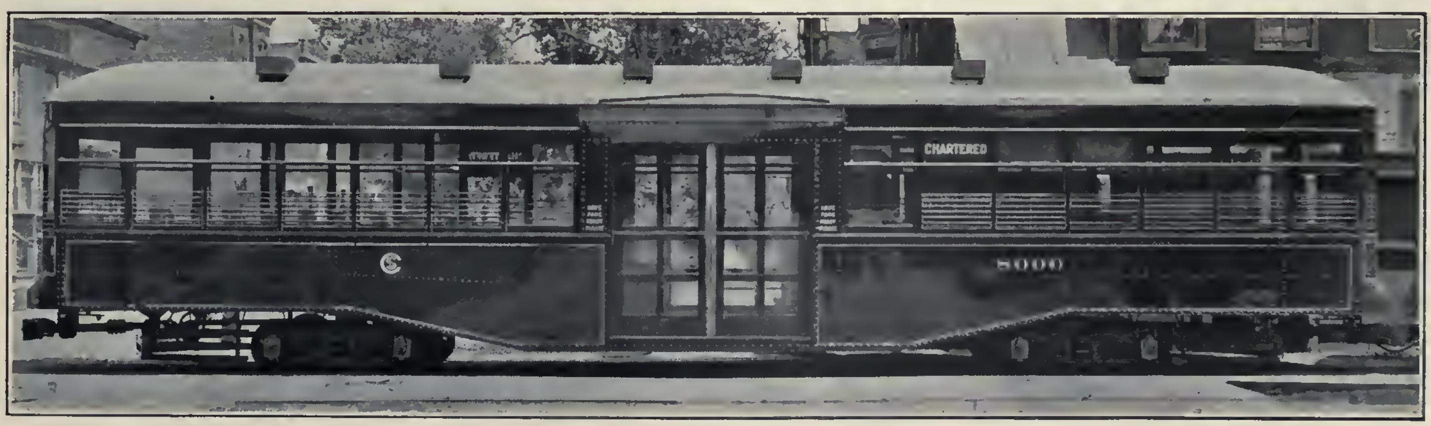
More Capacity by Intensive Use of Track and Men

Use of cars in trains increasing, with some activity in the direction of a car suitable for one-man or two-man single operation and in trains. The trend in trailer design with special consideration for reducing the standing time is treated. The distribution of the motors among various cars and several schemes of permanently coupled or articulated units are discussed. Newer developments in these directions largely experimental. Tendency is toward use of completely automatic couplers

◆

THE application of trains in electric railway work has become widespread. Not only are they advantageous on extremely heavy city lines, but for certain types of suburban service where regularity of headway is more essential than frequency they have advantages too great to be overlooked. They can be applied particularly well to various types of express service, and of course for rapid transit lines no other method of operation is considered. In interurban service, also, trains furnish a means of providing additional capacity for handling unusual crowds without the necessity of running extra sections, with the consequent complications of special train orders, unfamiliar meets and possible danger of collisions.

Two distinct methods of train operation have been developed in recent years. The first makes use of motor cars with sufficient power to haul one or more trailers, while in the other method all cars are motor equipped and are handled by some form of multiple-unit control. Considerable experimental work is now in progress along various lines, chief among them being development of articulated trains and trailers equipped with a portion of the motor capacity but without control.

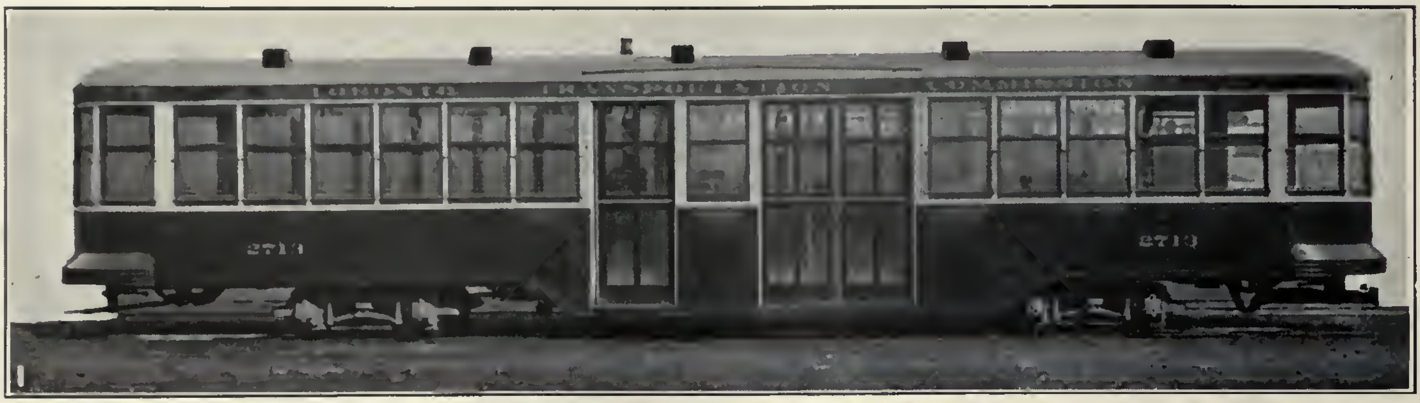


Light-Weight Double-End Chicago Trailer with Adjacent Entrance and Exit at Center

Among outstanding recent developments in train operation are the production of types of trail cars particularly suited to the demands of mass transportation, and means of coupling them in such a manner that the train may be made up or broken without serious loss of time on the road. In urban service two-car trains with trailers rather than multiple-unit motor-car trains seems to be the preference. Motor and trailer trains have been adopted in many cities where congestion is severe in rush periods.

There is, however, a growing tendency toward the use of light cars, with simplified multiple-unit control, so that they can be used for train service in the rush hours and as individual units the remainder of the day. Some recent one-man two-man cars are also being equipped with multiple-unit control for train service. In this way the benefits of the one-man car can be obtained during the lighter hours, and three men can handle the train in the rush. Units of this type, to be efficient as one-man cars, usually are too small to give the best results in heavy rush-hour train service. Where the need for trains is felt acutely the better practice seems to be to use the largest units practicable for the purpose.

The transportation problem has been made more difficult due to the marked accentuation of peak loading. As the larger cities have grown in population and area, there has come great concentration of business and manufacturing districts, and residences have been forced farther and farther out. While this, of course, has increased remarkably the number of workers who have to be transported twice a day, there has not been a corresponding increase in the off-peak riding. Prominent among the causes for this change are the development of the automobile and its use by women and the leisure classes, and the establishment of community centers, so that a large number of the daily purchases of the family may be made near by. The



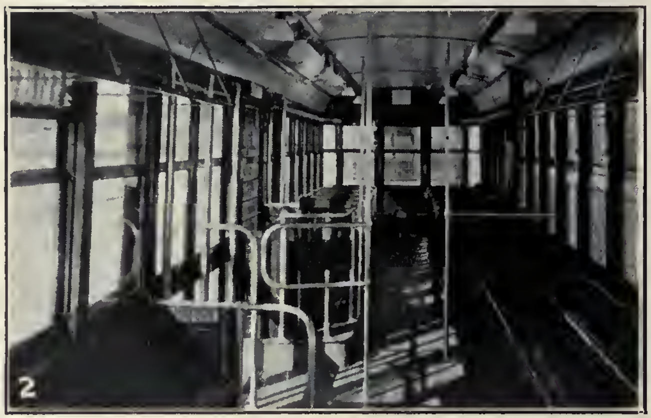
Special Features of Cars Used in Train Operation

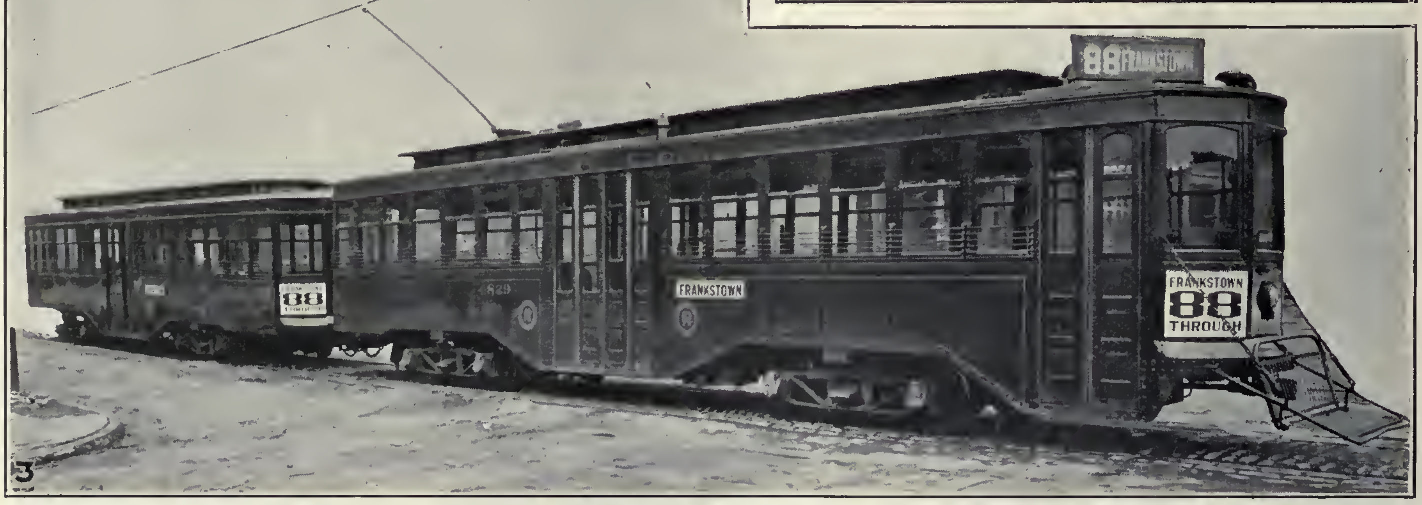
1. Toronto three-door trailer for pay-as-you-pass fare collection.

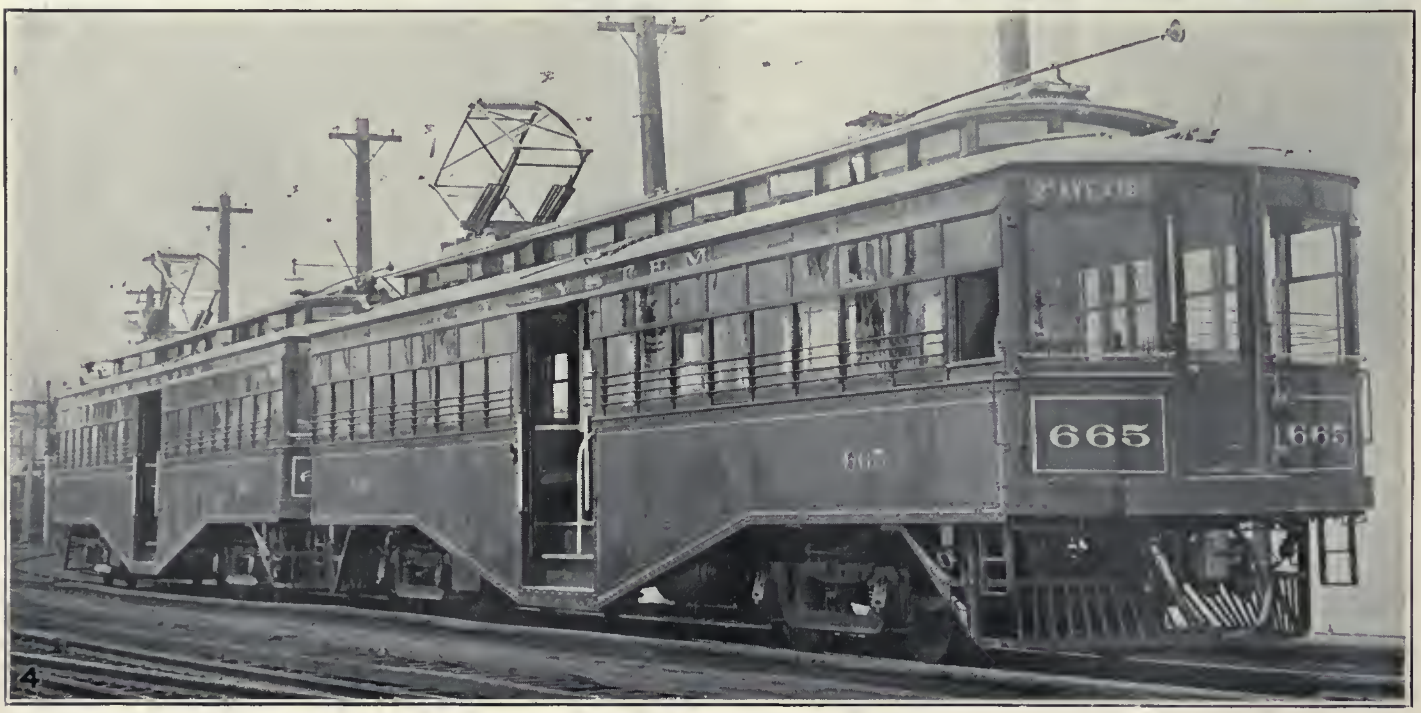
2. Interior of Toronto trailer, showing adjustable barrier for directing passenger movement.

3. In the latest Pittsburgh train two motors are installed on the trailer.

4. Center-entrance trains of this type are used for high-speed interurban service on Key System in California.







Montreal Front-Entrance, Single-End Type of Trailer

use of the telephone for ordering all sorts of merchandise and for conducting business generally also has cut down off-peak riding. Whereas the loading in the maximum hour ten years ago was perhaps twice that in the base, it now is more likely to run from four to ten times as great in the rush as in the mid-day.

Another factor that enters into the rush hour problem is the change in hours of labor in many of the trades. The general adoption of the eight-hour day has resulted in the workmen beginning their day's work so near the hour at which office workers start that it is not possible to get the cars back from the one load to take care of the other. In the afternoon the workmen are stopping work just before the office workers, and a similar difficulty arises.

TRAIN OPERATION REDUCES CONGESTION

Combined with these factors that have brought an accentuation of the peak demands, there has been a great increase in the movements of vehicles at the same hours that the maximum street car traffic is being handled, causing congestion far beyond what the original designers of the streets could have realized. This has resulted in the formation of congested points, usually at or near the business centers, but occasionally at other localities, where all traffic is slowed down. The street car, on account of the necessity for loading and discharging passengers, has been forced to bear the worst of the trouble. Regulations designed to keep the tracks free of interference frequently have been of little or no avail, and the difficulties incident to car movement have increased enormously. Operators are thus going more and more to train operation to reduce the number of units that must pass a given point.

Train operation is an excellent means of reducing congestion at intersections. Frequent tests have shown that the time taken by a two-car train in going through a street intersection is only about 30 per cent more than for a single motor car, although the carrying capacity is twice as great. That is, the use of trains, if properly spaced, can increase the capacity of an intersection as much as 50 per cent over what it would be were single units used exclusively. When the limit of capacity of the street is being approached closely, this is an advantage of no small importance. Of course, to get the most out of this, every movement must be co-ordinated with the others, so that there is no waste of time at the intersections. The stopping places should be chosen carefully so that a continuous stream of trains will be ready to pass through the intersection as soon as the signal is given by the traffic officer.

A number of railways have available cars that are either new or in good condition, which were designed for operation singly, but which have many of the characteristics essential for successful train operation. In general it has been the plan to utilize such equipment as far as practicable when installing train service, so as to reduce the required investment.

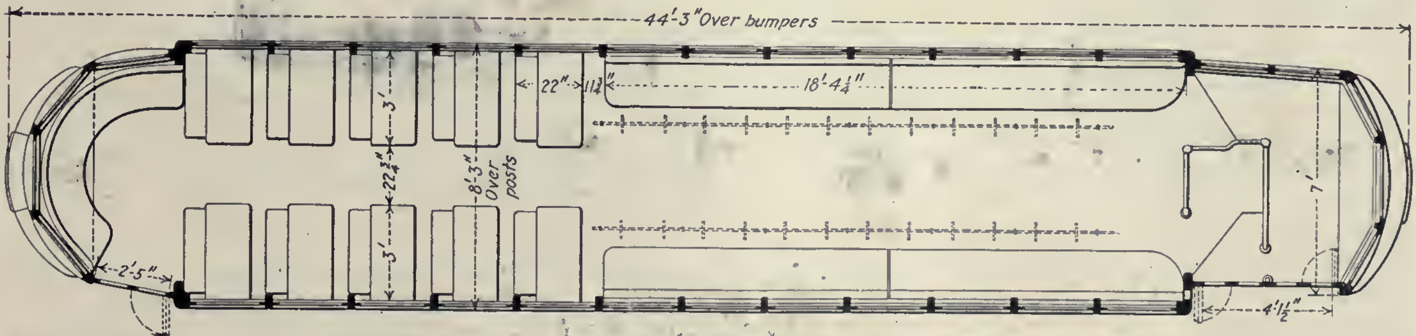
Many of the motors which were built a number of years ago have greater capacity than was anticipated in the design, especially since changes, such as the use of forced ventilation, have made it possible for them to carry excess loads for considerable periods of time. It frequently has been found possible to use these existing motor cars to haul trailers of light weight during the rush hours and thus provide large additional capacity for a few trips at reasonable cost. In many cases the motor cars have been used without change, except to add proper coupling equipment, while in some other instances they have been redesigned especially for train service.

For best results, however, the motor cars for train service should be designed for the purpose. Structurally, there need be little difference in the car design from cars operating singly, except that the sills and bolsters should be strong enough to stand the added strains. The major changes are in the arrangement of entrances and exits.

FACILITATING MOVEMENT OF TRAINS

The cars of a train, as nearly as possible, should all take the same time to load and unload. It is of little advantage to have the two cars equipped with time-saving devices if all the persons boarding or alighting at a particular stop use one or the other car alone.

Some persons have objections to riding in the trailers, engendered from the days of the old single-truck trains without adequate couplers, and in which the passengers bobbed around with little chance for comfort. For this reason particular attention must be given to the design



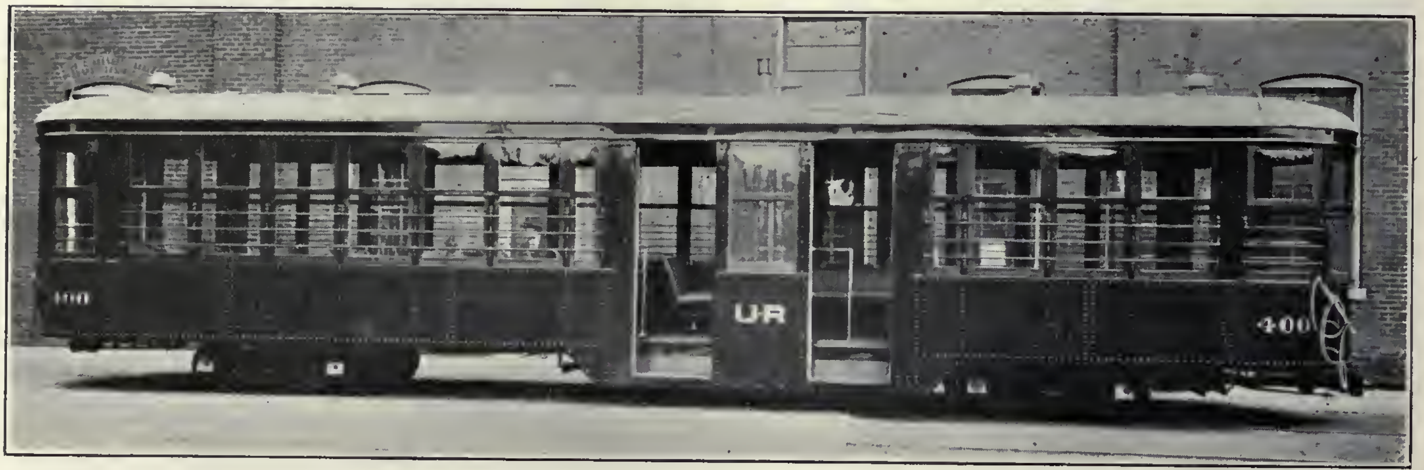
The "Near Side" Type Seating Arrangement Is Used In the Montreal Trailer of the trailing unit from the standpoint of comfort, by making both exterior and interior attractive, providing cross-seats wherever possible, and mounting the car on easy-riding trucks. By proper publicity, attention may be called to the fact that the trailer is really an easier riding car than a motor car, since it has no motors and electrical equipment, and nearly all the weight is springborne. There is also the absence of noise from motors or gearing. It readily can be seen that the trail car is, if anything, safer than the motor car, particularly in the event of head-end collisions.

Since a fundamental idea in train service is to provide greater track capacity than is possible with single-car units, everything must be done to facilitate the movement of the trains. Also, it is essential that the control of the second car be in the hands of one man in order to save labor cost. This ordinarily leads to the use of one door, or group of doors, close together. Many disadvantages that have been cited against the center door for a motor car disappear when it is used on the second car of the train. The only remaining valid objection is that the location of the center door of the trailer is a considerable distance from the rear door of the motor car, so that where but a few passengers are waiting to board the train there is wasted time while the passengers are deciding at which point to enter, and also the bulk of the load is likely to be carried on the motor car. If all the rush-hour service on a route is given with trains this is of little importance, as regular riders group themselves where they know one or another door of the train will be stopped.

Some railways have considered that better loading results were obtained by making the trailer a front-entrance car so that the loading doors of motor and trailer would stop at practically the same place.

DOOR ARRANGEMENTS FOR TRAILERS

It is even more desirable to have ample entrances and exits on train units than on cars designed for single operation only. Two designs of trailer are in general use, that with doors at the front end only, and that with center doors. Originally a single door was used at the center, but with cars seating fifty to sixty persons, and proportional standing space, this was found entirely inadequate, and double doors were substituted. Two distinct arrangements are now used for center-door trailers. In the first one the two doors adjoin, in general being operated by one engine or pair of engines working together. In the second arrangement there is a space between the two doors 1 ft. to 3 ft. wide, the doors usually being arranged for independent operation.



The Doors on This St. Louis Trailer Are Separated so that Pay-as-You-Pass Operations Can Be Used

"PAY-AS-YOU-PASS" PLAN ON TRAILERS

One of the limitations of either of these designs is that with prepayment the passengers must board the car only at a rate such that fares can be collected. Hence it may not be desirable to open both doors at once. The rate of fare collection, then, is the real limitation to speed of loading. It is much slower than in the case of a motor car using the pay-as-you-pass system, in which case passengers can board as rapidly as is physically possible, and pay their fares at any later time before leaving the car.

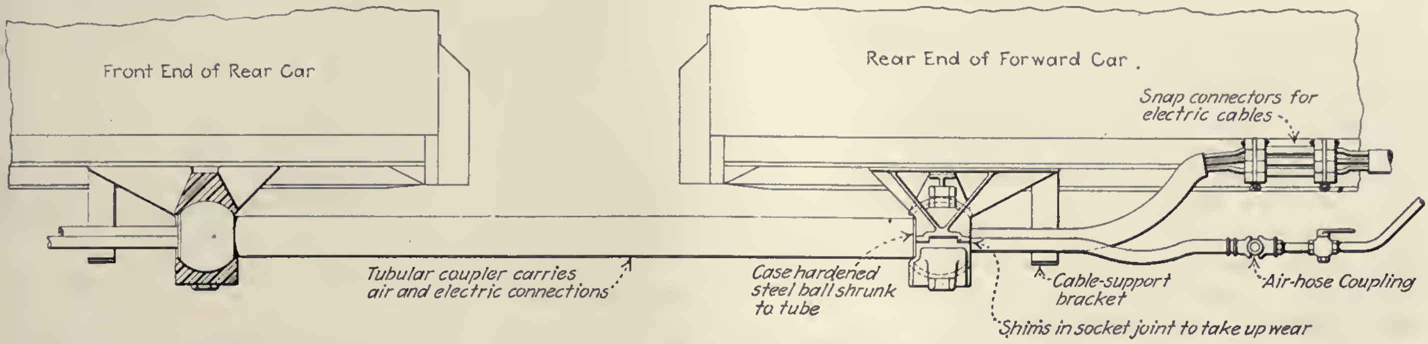
This latter principle has been applied in several types of trailer built in recent years. An example of this is the St. Louis trail car. The two doors, which are located slightly forward of the center, are separated by a distance of about 3 ft., the conductor's position being between them. The forward door normally is used as an entrance and the rear one as an exit. Fares are collected as the passengers pass by the conductor in going from the front to the rear section.

It is possible to use both of the doors as exits at heavy unloading points, by blocking the passageway between the front and rear portions, and collecting from unpaid passengers as they leave the car from the forward portion.

A similar door arrangement was used in the first type of trailer built by the Toronto Transportation Commission. An interesting improvement has been made in the latest type of Toronto trailer. In this car there are three doors near the middle of the car, two of which adjoin, while the third is located toward the rear a distance of some 3 ft. In the space between these doors is the conductor's stand, containing the door control, fare box and change counter. The door control valves are so arranged that the conductor can operate the three doors independently of each other so as to control passenger movement.

A stanchion is placed on the car floor between the two forward doors supporting a gate made of pipe in such a position that it can be used as a barrier between the two doors or between the doors and the fare box.

In operation the rear door is always an exit and the forward door is always an entrance, while the middle door may be either, depending on the ruling direction of the passenger-

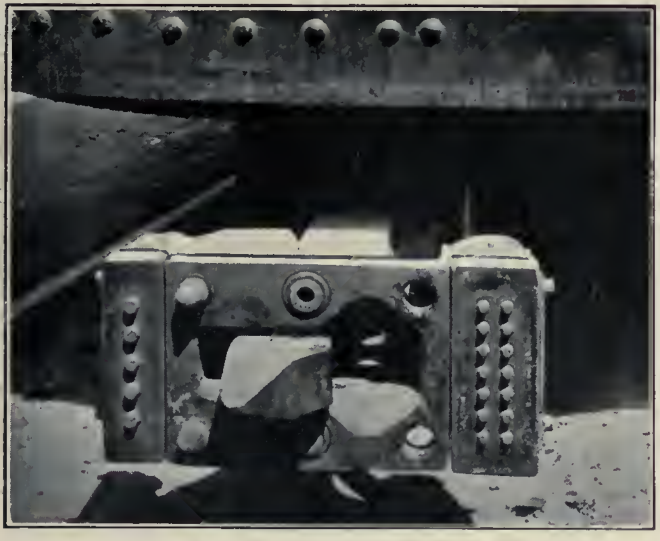

Front End of Rear Car
Rear End of Forward Car
Snap connectors for electric cables
Tubular coupler carries air and electric connections
Case hardened steel ball shrunk to tube
Cable-support bracket
Air-hose Coupling
Shims in socket joint to take up wear

The Minneapolis Train Is Coupled Permanently with a Hollow Tube Drawbar Containing Air and Electric Connections

movement. Pay-as-you-pass fare collection is used. Inbound, during the morning rush, the two front doors are used as entrances, accommodating two streams of passengers, the barrier being set so that passengers turn slightly to the right as they enter. When the trailer reaches the unloading zone on the inbound trip the barrier is moved by means of a lever at the conductor's stand, so that passengers from the forward section of the car, who have not yet paid, may deposit their fares and leave by the door at the conductor's right, without interfering with those who had paid previously and who are leaving simultaneously by the rear door. In tests this arrangement showed a saving of approximately one-fourth the time taken with a two-door car of the earlier type. This arrangement of doors is used only for the second car of a train, the leading car being of the Peter Witt type.

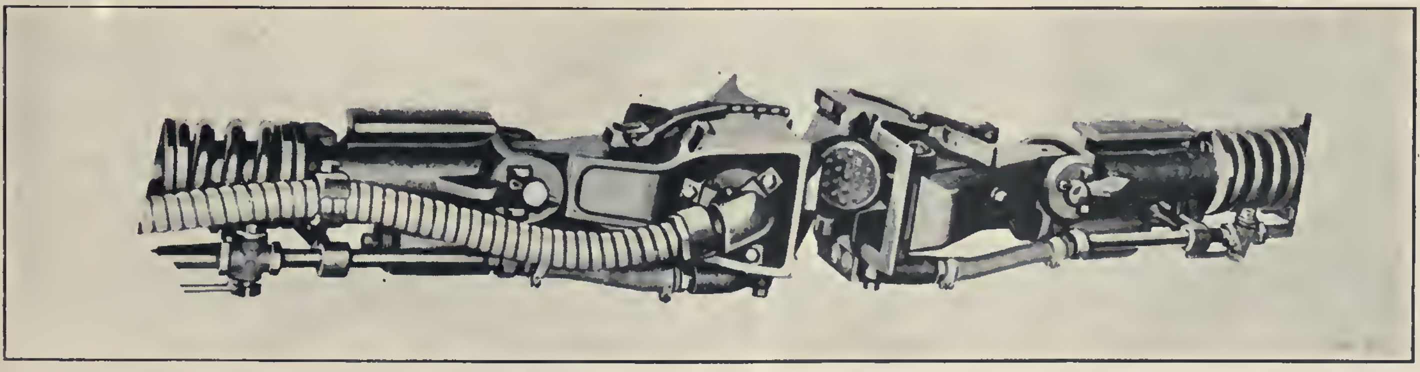
In a train developed in Minneapolis by the Twin City Rapid Transit Company, consisting of two permanently coupled cars with front and rear end doors, there is an ingenious division made between the duties of the motorman and the conductors. The front door of the leading car is, of course, controlled by the motorman. Since he is not actively engaged while the train is standing still at a stop, control of the rear door of the front car also has been given to him. With a mirror he can see readily when this door may be closed. The conductor of the leading car, relieved of the control of the door at his own position, controls the front door of the trailing car, at which point there is no trainman. He can see directly from his position when the door should be opened or closed. The rear door of the rear car is directly under the observation and control of the second conductor. The controls are so arranged that changes in the method of operating the doors can be made readily.

A problem that must be faced in the use of trains for urban service is that of determining whether they will be used for the rush hours only, or will be in service all day. From the standpoint of merchandising transportation there can be but one answer. In the rush hours the problem is to carry as many passengers

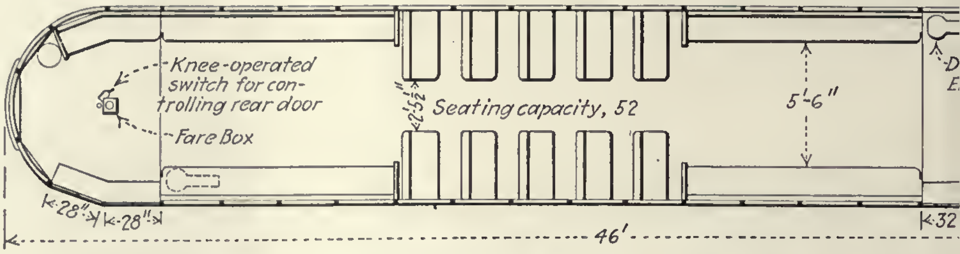


Top, Left—In This Type of Automatic Car, Air and Electric Coupler the Electric Contact Heads Are Mounted on the Sides.

Right—Spring-Supported Carriers Provide for Breaks in Grade in This Type of Car Coupler.



Below—A Type of Automatic Car, Air and Electric Coupler with Electric Contacts Contained in Head.



In the Minneapolis the Conductor of the Forward Car Controls the Front Door

as possible, and this is best done by the use of units as large as can be handled effectively on the streets.

The non-rush problem is entirely different. For the non-necessity rider it is a matter of convenience. When it is known by the patrons that frequent car service is available, more rides will be taken, and the family automobile will be left in the garage to save "gas" and the worries and inconvenience of parking downtown. But in most cities there is not enough of this non-necessity business to justify frequent service with units seating over 100 passengers, and even in the largest cities the number of such lines is very limited. Even a fifty-passenger car is large for most mid-day requirements if "car-in-sight" service is given.

In Cleveland and Detroit trailers are run all day on certain lines. The service given is not, of course, on as short headways as could be provided with single cars. There is a saving in platform labor from the train operation, but for a considerable part of the non-rush periods there are many empty seats that are provided in order to prevent such long headways that riders would be driven away from the lines.

CONSIDERATIONS IN ADOPTING THE MOST SUITABLE FORM OF TRAIN

A limitation to the extension of the use of train operation in city service, particularly for the non-rush periods, is that the streets where congestion is most acute, and which at first sight may appear most suitable for train operation, ordinarily are served by groups of lines which divide and go to various destinations on diverging routes outside the business center. Even where the trunk line is not split in this manner, it may be desirable to give a considerable amount of short-line service, which has a similar effect in limiting the applicability of such large units.

The principal difficulty encountered in attempts to use the one-man car for the mid-day, supplemented with trains for the rush hours, is that the two types are not equally suitable for the heavy requirements. Mixing trains and single units on a route leads usually to overcrowding of the single cars and underloading of the trains, with headways distorted and service poor. It is much better to have the equipment on a route or group of routes uniform, and take care of the variation in load requirements by modifying the spacing between cars.

The best answer to the question of flexibility of service may be found in the use of multiple-unit trains. With identical units the non-rush demands can be taken care of without difficulty by use of single cars, and in the rush the trains can be made up on short notice by attaching identical cars to them. With modern types of control and automatic couplers this can be done readily. The latest development in giving flexibility of equipment has been the one-man two-man car arranged with multiple-unit control to allow train operation during the rush hours. As previously pointed out the limitation in this attempt to provide a "universal equipment," that is, one-man two-man cars and three-man trains, is the fact that a car which is suitable for one-man operation is not the most efficient unit for conditions which call for train operation. That is, if not too large for one-man operation, it is too small for train operation.

In some instances arrangements have been tried using four-motor cars for all-day service, supplemented by cars of practically identical type equipped with two motors having like electrical characteristics, and with control. The operation is the same as where all cars are alike, except that care must be taken that the four-motor cars are the ones used for the base service, since the others would not be able to give the speed required, and the motors would be liable to overheat. It is, however, a compromise between trailers and the ordinary multiple-unit operation that merits attention.

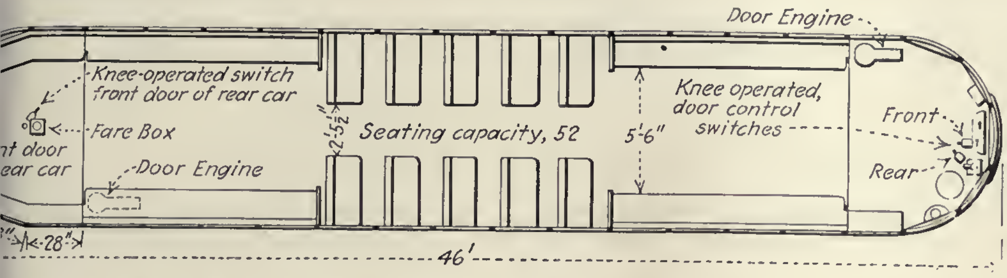
Tests have been made on various combinations of motor cars and trail cars for train service, with a view to determining the best arrangement of the electrical equipment. Unquestionably straight trailer operation calls for the least investment, since the power can all be concentrated in two or four motors, with a simple type of platform controller. The electrical connections to the trailers need only supply lights, heaters, and signals, and can be made without difficulty by the automatic couplers now on the market.

The use of multiple-unit trains involves the use of a more complicated control which, although it can be made entirely satisfactory, is somewhat more expensive to install and maintain. The flexibility obtained by this arrangement is, on the contrary, very much greater than where trailers are used.

A type of train intermediate between the trailer and the multiple-unit train has been developed recently by the Pittsburgh Railways Company. A four-motor car of the type standard in that city is coupled with a trailer car equipped with two similar motors. By using an ingenious method of wiring a three-line jumper provides for motor connections between the cars, there being no controller on the second car. The advantages obtained for the train are that the motor capacity is better proportioned for the work than where straight trailers are used, and that the expense of construction and maintenance are considerably lower than with multiple-unit control. The motors on the second car are permanently connected for forward motion, as the four motors on the motor car furnish sufficient power for backing. The second car, although equipped with motors, remains essentially a trailer, and must be handled about the yards and shops as if it had no electrical equipment whatever.

In Milwaukee an arrangement has been tried for using two double-truck cars to form a complete unit for train service. A permanent flexible coupling and vestibule is provided between two cars. Directly under the coupling is placed a swiveling truck, the two inner trucks of the cars being taken off, so that the entire unit is supported on three trucks. The train, of course, can only be operated as a single unit, and thus is suitable for rush service only.

The idea of the articulated unit has been carried still further in the design now being worked out for



f the Trailer While the Motorman Controls the Rear Door of the Motor Car

use in Detroit, which is shown in an accompanying illustration. There are three separate bodies connected with flexible vestibules. Trucks of ordinary design are placed at the ends and carry the four 60-hp. motors that propel the train. The motors are controlled by a platform type controller, operation being single-ended. The two inner trucks are of special type, and are placed over the swiveling joints between the center section and the two end sections.

Connection between the bodies is made in an ingenious manner by means of a vertical cylinder supported from the truck and rotating with it. The end of the car is also cylindrical, and rotates around the vestibule section.

The two conductors are placed between the sections, collecting fares on the pay-as-you-pass system. In the morning the two end doors of the unit are to be used for loading and the center door for unloading, while the process is reversed in the evening, the entrance being at the center and the exit at the ends.

It is expected that this type of car will have the advantages of lower first cost, less platform labor, maintenance, and power costs than with trains of the ordinary type. It is, however, extremely large for operation on city streets, and has a disadvantage from the schedule standpoint of having 140 seats in a single operating unit. The necessity of taking the entire unit out of service to do repair work on one of the sections is to be met to a certain extent by substituting another section for the one out of order. The weight of the complete unit is estimated at 72,000 lb. The cars now in use in Detroit weigh 37,000 lb. and seat fifty passengers.

In the few instances where trains are in use that are permanently coupled, this of course means that the two cars must be considered at all times as a single unit. This limits their use for practical purposes to the rush hours. Unless the single cars which are in service all day are coupled with second cars to give trains practically uniform with the permanently coupled units, there will be the non-uniformity of equipment mentioned previously that leads to unsatisfactory loading conditions.

The permanently coupled train has the further disadvantage that in case one of the cars is disabled the entire train must be taken out of service and laid up for repairs, while with couplers the disabled car can be removed and another substituted quickly. This means that a greater provision for reserve equipment must be made.

So far as the mechanical arrangements with permanent couplers are concerned, they can be made quite satisfactory. Probably the most recent development in this direction is the unit designed by the Twin City Rapid Transit Company, which is shown in an accompanying illustration. For coupling, a special hollow round bar is used, with a ball-and-socket joint connecting it to each car. The electrical and air connections are carried within this hollow coupling bar. It is stated that tests have shown this rigid type of coupling to be very satisfactory.

MODERN COUPLER PRACTICE

The selection of coupler equipment is nearly always limited by at least three conditions. First and most vital is the minimum radius of track curvature to be encountered on the system; second is the existence of abrupt changes in track grade; and third is the adaptation of the coupler to existing cars that must be equipped with them.

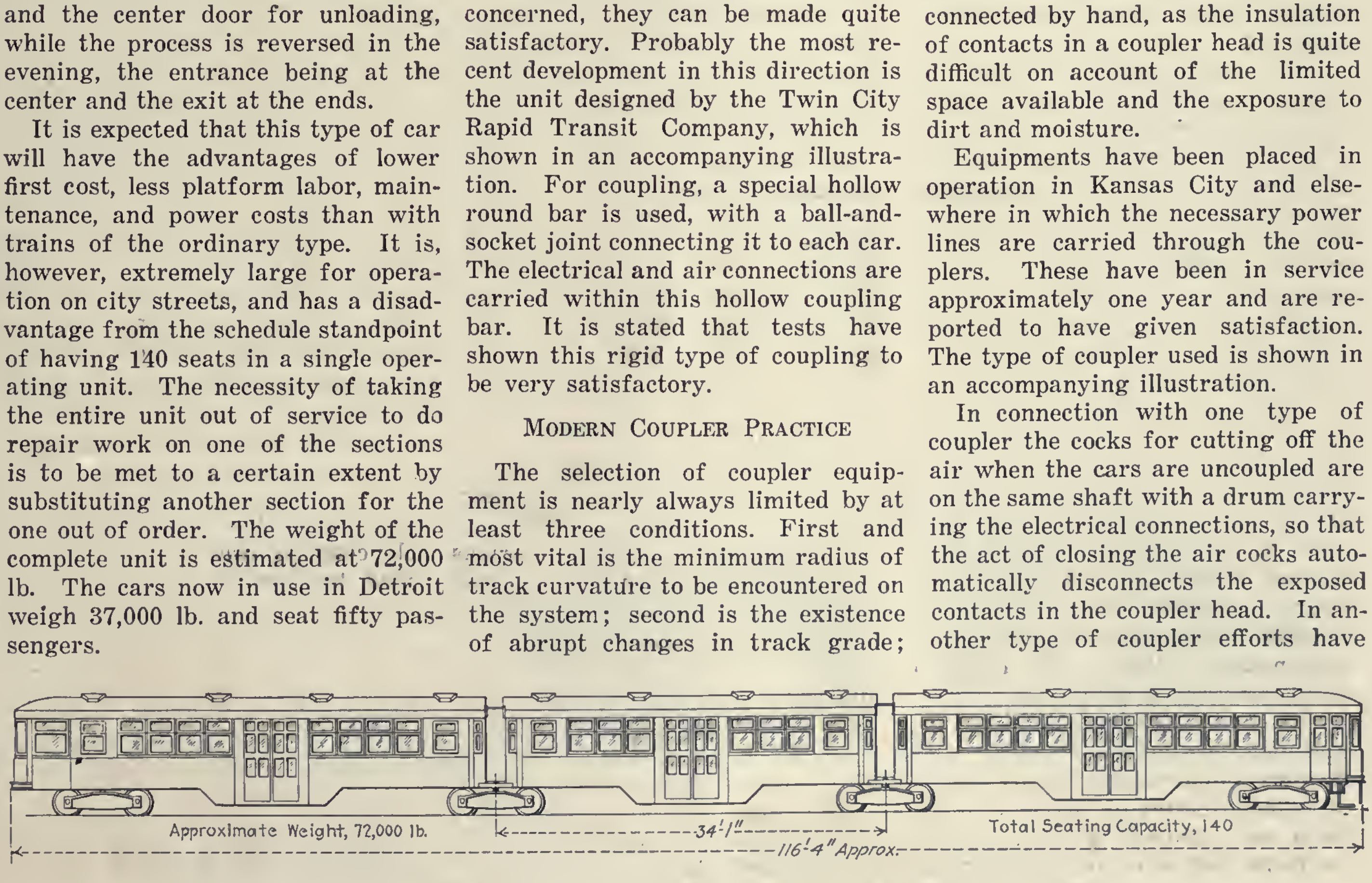
Satisfactory coupler equipment demands a certain space under the end of the car, and the very nature of the device makes it essential that the clearance space be kept free of all obstructions, even though they be such important parts as fenders, car steps, or door operating mechanisms.

In recent years it has been found increasingly desirable to incorporate also such electrical connections as are necessary into the coupler, so that all or a large part of the wiring can be connected automatically when the cars are joined. In trailer service this may consist only of the light and heat wiring, although it is possible also to connect such circuits as door interlocks, buzzer and bell signals through the couplers. The simple action of bringing the cars together makes all the mechanical, air and electric connections automatically. It then is necessary only to throw two air cocks to open up the air brake line.

For multiple-unit control it is possible to carry the leads for the control wiring in the coupler head, so that these circuits are all completed automatically. Until recently the power wiring has been carried in separate jumpers that have to be connected by hand, as the insulation of contacts in a coupler head is quite difficult on account of the limited space available and the exposure to dirt and moisture.

Equipments have been placed in operation in Kansas City and elsewhere in which the necessary power lines are carried through the couplers. These have been in service approximately one year and are reported to have given satisfaction. The type of coupler used is shown in an accompanying illustration.

In connection with one type of coupler the cocks for cutting off the air when the cars are uncoupled are on the same shaft with a drum carrying the electrical connections, so that the act of closing the air cocks automatically disconnects the exposed contacts in the coupler head. In another type of coupler efforts have



The Proposed Detroit Three-Car Articulated Unit Is to Be Handled by Three Men been made to provide a shutter that protects the coupler head against the weather when it is exposed at the end of the train.

In conclusion, it may be said that while there is at present a great deal of activity in the direction of developing a universal car applicable to one-man or two-man single-car operation, and to three-man train operation, there is not sufficient evidence as yet to demonstrate that this would be as good for very heavy service requirements as the large capacity cars designed specifically for such train service.

Mechanical and Electrical Equipment Keeps Pace—I

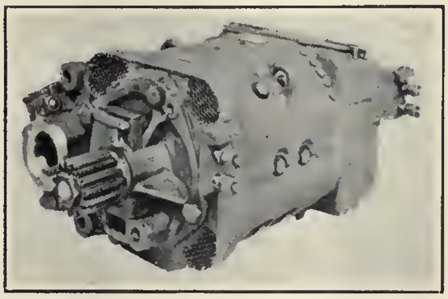
(*Continued from page* 519)

eral decrease in car weights, has produced a rather difficult situation for the truck designer.

The subject of truck springs is almost entirely a problem of the relation between minimum and maximum loads. In the case of street cars the minimum load is the weight of the empty car body together with those truck and equipment parts that are supported by the springs. The maximum load is the sum of this constant or dead load and the variable passenger or live load. The springs must be designed for this maximum load plus a certain reserve for unusual loading conditions or for the effect of road shocks. As the weight of cars has been decreased, the live load has gradually approached the dead load in value, and in many modern cars has become very nearly equal to it.

The importance of low step heights makes it necessary to carry the car body as low as possible on the truck. This requirement has held the clearance between body and truck parts to an average value of about 3½ in. This condition adds again to the difficulty of obtaining easy riding springs without at the same time obtaining either excessive deflections or fiber stresses for comparatively small overloads.

The conditions encountered have led to various arrangements of modern truck springs to provide graduated or compound spring systems which would give easy riding under small passenger loads and at the same time restrict the maximum deflections under extreme loading conditions. The method of providing a light-load helical spring with limiting stops on the spring caps was described under the discussion of the arrangement of springs in trucks.



Modern Full Ventilated Railway Motor, Showing Arrangement of Air Openings in Frame

Another method developed is based on making the elliptic spring the light-load unit and limiting its deflection by interposing a comparatively stiff spring between the bands. In this design a full-elliptic spring is located under the bolster and a volute or flat spiral spring wound in a helix is mounted between the bands of the full-elliptic so that although the latter is made flexible enough to absorb vibrations under light load, the total deflection is limited under heavy loads by the action of the stiff spiral.

In order to obtain spring capacities sufficient to prevent undue deflection under heavy load, and at the same time provide the necessary flexibility to insure easy riding under light load, there has been a tendency to work truck springs under street cars at fiber stresses that are close to the elastic limit of the material. Under such conditions an unusual road shock or extremely heavy passenger load will cause a permanent deformation of the springs. This results in a settling of the body, and it has been necessary in many cases to insert blocks under the center bearings to maintain proper clearances after cars have been in service. As a result of this condition, many cars which were originally designed with desirable step heights are actually operated with bodies blocked up to an excessive height.

The use of higher grade materials for car springs as a solution for some of these problems has been considered. There is a tendency, however, to favor the development of improved spring arrangements which will hold down the stresses imposed on springs of present materials by the further application of graduated spring systems similar to those described.

The balance of this chapter, which describes the developments made in air brake, control and current collecting apparatus, will be published in next week's issue of the JOURNAL.

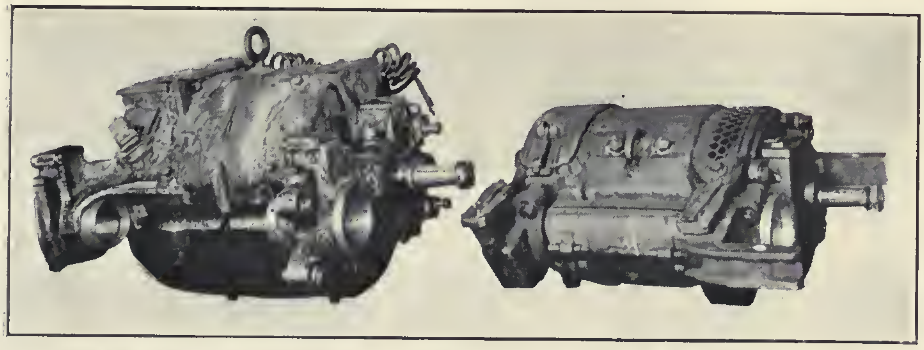


Illustration of Progress in Motor Design. Left—Early Inclosed Type Weighing Approximately 70 Lb. per Horsepower. Right—Modern Ventilated Design Weighing 32 Lb. per Horsepower

American Association News

The Largest Street Railway Exhibit Ever Held

REPORTS from Manager F. C. J. Dell, in charge of exhibits at the Atlantic City convention, indicate that this will be the largest street railway exhibit ever held in this country. Up to Sept. 26, 73,044 sq.ft. of exhibit space had been rented. This compares with 62,219 sq.ft. at Atlantic City in 1919, 59,528 sq.ft. in Atlantic City in 1920, and 62,095 in Chicago in 1922.

On Sept. 26 of this year the number of exhibitors was 160.

The News of the Industry

City Is Insistent

Mayor of Davenport Says that Tri-City Railway Must Meet Its Paving Obligations

Mayor Alfred C. Mueller of Davenport has replied by letter to B. J. Denman, president of the Tri-City Railway, who recently notified the Mayor that unless some remedial action was taken service would probably be discontinued. The Mayor has now demanded that the company proceed with the work it contemplated doing and carry it to completion. It will be recalled that the company had stated that unless some plans for relief could be worked out within a reasonably short time (ninety days at the most) there was no alternative save to turn the property over to the creditors to obtain what they could from the salvage of the physical properties.

COMPANY NOTIFIED TO PROCEED

The communication of the company to the Mayor, published in full in the ELECTRIC RAILWAY JOURNAL for Sept. 15, page 419, was read at the committee of the whole meeting of the City Council on Sept. 4 and at the regular meeting of the Council, on Sept. 5, was referred back to the committee of the whole. After receiving the communication and after it had been discussed to some extent, some doubt existed as to the meaning of the sentence "in the meantime it is clear that the company is absolutely unable to proceed with any of the public improvements now contemplated."

At the request of the members of the Council, the Mayor asked for further information and was told that this meant that the Tri-City Railway did not intend to go on with the completion of its part of the extensive paving program planned and contracted for by the city authorities.

At the committee of the whole meeting of the members of the City Council on Sept. 19, the letter from the company was again discussed and at the conclusion of this discussion, a motion was unanimously adopted that the Tri-City Railway be notified to resume forthwith its paving work and carry out the company's part of the paving work which has already been contracted for by the city.

In his letter to the company the Mayor said:

> Your attention is called to the fact that in the early part of this calendar year, after the Council had decided upon its paving program, the proper notices required by law, were given to all parties concerned and among others, your company received due notice of the contemplated improvements. Subsequent to that time, matters relating to this paving were frequently discussed by officers of your company and representatives of this city. At no time was a formal protest or objection made on the part of your company and there was no intimation that you would fail to carry out your part of the agreement. The city entered into contracts for the construction of this paving fully believing that your part of the work would be promptly done.
>
> During the negotiations relating to the rerouting plan submitted by your company, the matter of paving was again freely discussed and representatives of your company stated that no matter what the final disposition of the rerouting plan would be, that your company would carry out in full its part of the paving.
>
> A large part of the paving has been completed and yet there are some extremely important paving jobs which are unfinished and which cannot be completed in a satisfactory manner if you persist in your refusal.
>
> The members of the Council therefore feel that the attitude you are now taking is not a consistent one and is entirely out of harmony with the position taken by representatives of your company heretofore. They feel that your company is legally and morally bound to go on with the work and carry it out to completion and I am taking this opportunity to inform you of the action of the Council and to demand that your company forthwith proceed with the work and carry it out to completion.

Philadelphia Voters Approve Fund Transfer

By a vote of practically four to one the citizens of Philadelphia on Sept. 18 expressed their approval of "Step No. 1" of the proposed comprehensive transit plan adopted by the City Council after a series of meetings with the Transit Commission and the Philadelphia Rapid Transit Company. "Step No. 1" provides for a four-track Broad Street subway from Olney Avenue to Spruce Street, the Ridge Avenue loop and subway lines in Chestnut and Walnut Streets to West Philadelphia.

The election showed the voters approved the using of funds voted for in 1916 and 1920 for the new plan instead of for the purposes for which they were originally intended.

The various steps in the transit program in Philadelphia have been outlined previously in the ELECTRIC RAILWAY JOURNAL.

Acquires Property for Power Development

With the acquisition of the Toledo & Western Railroad line and two large utility properties at Adrian, Mich., the Doherty interests will make that road the basis for considerable development in the distribution of power to municipalities and industries along the right-of-way. The Citizens' Light & Power Company and the Lenawee Gas & Electric Company, valued at more than $1,000,000, have been purchased by the Cities' Service Company. The Adrian Street Railway and the Toledo & Western enable the company to tie in these properties with the Toledo Edison Company and other Ohio properties.

Electrification Suggested

Engineers Complete Studies of Albany Zone Changes—Immediate Work Not Planned

Electrification of the Boston & Albany Railroad from Albany, N. Y., to Springfield, Mass., and the electrification of the new Hudson River Connecting Railroad and the freight yards in the Castleton-Ravena-Selkirk area are the next big steps in the transportation development of the district at Albany.

ENGINEERS' REPORTS PRESENTED

Reports and recommendations made by engineers covering the electrification work have been submitted to officers of the New York Central and the Boston & Albany, as a part of the program of improvements to be carried out in the future, but the decision remains to be made by the officers of the company as to when the work will be commenced. Chief Engineer G. W. Kittredge says that he does not believe the work will be authorized this fall, and he has no definite information as to whether it would begin in the spring.

The plan covers 100 miles of electrification on the Boston & Albany and the establishment of a full electrical equipment for the company's freight yard at Selkirk.

Proposed electrification of the Boston & Albany calls for catenary type of construction such as is in use on the Chicago, Milwaukee & St. Paul road's electric division, with a 3,000-volt direct-current load. The Selkirk yards are to be unique in their bulk classification work and it is said that because of this very fact the application of electrical power will be a big economy.

Extension of New York Central electrification from Harmon toward Albany has no direct connection with the proposed electrification of the Boston & Albany, it is said.

CONNECTING RAILROAD IS NEARLY COMPLETED

Work on the Hudson River Connecting Railroad, which began last fall, is a little more than half finished. The contract includes erection of a bridge across the Hudson at Castleton, connection on the east side of the river with the Boston & Albany tracks not far from Niverville, and connections on the west side with the present West Shore line, as well as the establishment of the largest freight yards in the world. The original contract represented an expenditure by the company for this work of approximately $20,000,000.

Chicago Surface Trackmen Want to Return

Trackmen employed by the Chicago Surface Lines, on a lone strike since Sept. 12, were reported on Sept. 26 to have had their overtures to return rejected by the company. Skilled mechanics—electricians, machinists, sheet metal workers and others—who had voted with the laborers to strike on July 30 agreed to accept Mayor Dever's advice and arbitrate.

The substation electricians have made no demands as yet. They receive $200 a month and chief electricians are paid $210 a month.

The trackmen, however, refused to accept arbitration and quit work. At another meeting held subsequently the laborers by a vote of four to one decided to continue their strike. Officials of the surface lines declared that the strike was not affecting service. One official said that the company had all the men necessary for emergency repairs and could run for six months if necessary without the strikers.

The trackmen number about 1,200. They want an increase of 28 cents over their present minimum of 54 cents an hour.

The union laborers and mechanics voted originally to strike rather than accept the company's wage increase offer of 3 cents an hour.

The company's offer was the same as the wage increase granted the motormen and conductors by the arbitration board which settled the wage dispute between the company and the union carmen.

The laborers and mechanics demand that their wages be increased all the way from 10 to 45 cents an hour.

The present wage rates and the rates demanded by the unions organized among the men employed by the railway company follow:

Union	Present Wage Per Hour	Wage Demanded
Electricians No. 713 (armature winders)	$ .90	$1.00
Electricians No. 9 (linemen)	1.10	1 25
Blacksmiths	.92	1.10
Sheet metal workers	.90	1.00
Machinists	.90	1.00
Patternmakers	.80	1.25
Laborers	.54	.81
Painters	.60	.87
Assistant foremen	.67	.94
Wreck wagon drivers, per day	5.20	6.50

Extension to Cost $4,000,000

An extension of the Dorchester tunnel in Boston and the use of the Shawmut branch of the New York, New Haven & Hartford Railroad to Mattapan station is assured by the action of the Boston City Council in accepting the legislative act of the present year. The work will begin early next year, will take about two years to complete and will cost approximately $4,000,000, and after it has been built it will be leased by the city to the Boston Elevated Railway.

The present tunnel will be extended from Andrew Square, under Boston Street and under land of the Old Colony Railroad, coming to the surface by an incline south of Dorchester Avenue. Then there will be a surface track to Harrison Square, whence the tunnel cars are to run over the electrified Shawmut branch of the New Haven railroad to Mattapan, at the junction of River Street and Blue Hill Avenue.

Mayor Curley would depress the tracks all the way out so that a highway may be constructed above them like Park Avenue in New York.

Brooklyn Officials Not Culpable

No Indictments in Connection with "L" Accident—Tightening of Operating Rules Suggested

In a brief presentment handed up to County Judge Reuben L. Haskell on Sept. 10 the June Grand Jury of Kings County reported that in its investigation of the accident of June 25 on the Fifth Avenue elevated line of the Brooklyn-Manhattan Transit Corporation at Flatbush and Atlantic Avenues, Brooklyn, in which eight persons were killed and about fifty injured, it found no evidence of culpable or criminal neglect and no evidence sufficient to warrant an indictment against any one.

Included in the report were a number of recommendations growing out of the Grand Jury's investigation. The first recommendation was that trackwalkers should be of a more intelligent grade and should be able to speak the English language. The second was that there should be more stringent inspections of all vital parts of rolling stock and structures. The other recommendation dealt with construction features and relations with the Transit Commission. The jury said:

> We respectfully report to the court that we have been unable to discover evidence sufficient to warrant an indictment against any person for culpable, or as is sometimes called, criminal negligence.
>
> Trackwalkers—These men should be of a more intelligent grade, thoroughly able to read, write and speak the English language, and their routes should be shortened to one-half of the present length, so that more frequent inspections of the roadbed can be made.
>
> Inspection—For the safety of the public at large a more stringent inspection of all vital parts of rolling stock and structures should be given in greater detail throughout the entire system. To this end we suggest that the bonus be doubled which is now given to inspectors on the discovery of defects which might cause accidents. This would serve as an incentive to the inspectors to make their inspections more complete.

In regard to repairs to structure and roadbed, the Grand Jury recommended a complete system of indexing short and long ties, inner and outer guard timbers, by means of plates numerically arranged, so as to expedite repairs and renewals on a sectional basis. Regarding all steel running rails, guard rails, frogs, switches, switch stands, fish plates and special steel work, it is recommended by the Grand Jury that a sectional system also be adopted, and that each and every part of the aforementioned steel parts be stamped numerically with steel dies. The report then says:

> By adopting this system the entire road, including all wood and steel work, would be subdivided into sections, from station to station.
>
> We suggest that the installation of inside steel guard rails at switches to the limit of practicability, so as to lighten the thrust imposed on outside guard timbers in case of derailment.
>
> We also suggest that rules be promulgated and rigidly enforced regarding the speed with which trains may approach frogs and switches. We further recommend that steel girders, extending upward at least 3½ ft. above the roadbed, be installed at all curves and at special work where the running rails are interrupted by frogs and switches. At these points experience teaches that derailment most frequently occur. These girders would serve to prevent derailed trains from running off the structure.

In regard to the Transit Commission, the Grand Jury said in its presentment:

> We strongly recommend that all orders of the Transit Commission for repairs and renewals be more promptly complied with than is done under the present system. We understand that this commission is authorized by law to see that its orders are promptly carried out and that such orders are to be regarded as mandatory rather than as mere suggestions.
>
> We likewise recommend that a closer relationship, if possible, should be established between the Transit Commission and the railroads to the end that the safety of the traveling public will be first, last and at all times in the minds of those charged with this duty.

Will Discuss Railway Offer

Negotiations between the city of Ottawa and the Ottawa Electric Railway will be started at once looking toward a settlement of the railway question with respect to extensions and service changes. Mayor Plant said that he would call a meeting of the Board of Control to consider the latest offer advanced by the railway company, as he believed that not a moment should be lost in coming to some agreement.

The company's offer asks for a renewal of the 1893 agreement with the city, but with supplementary amendments. One is for the cancellation of the special rates which provide for the sale of eight tickets for 25 cents good at specified times and seven tickets for 25 cents good at other times.

Permission is also being sought for exemption from taxation except that the usual assessment on real estate be made to apply as long as the renewed agreement exists. The company also asks for the right to operate one-man cars on the lines where traffic is light. The company asks the city to prohibit other passenger carriers, excepting taxis and cabs operating within the city, but offers no objection to interurban business.

The proposal wipes out Sunday fares, leaving the 5-cent rate for adults, 3 cents for children, school children twenty for 50 cents and the 10-cent rate after midnight.

General Manager Burpee stated that the company would be willing under these conditions to maintain the 5-cent fare and complete the Feustel recommendations as to extensions by the end of 1928 when the present automatic renewal of the present franchise expires. It is the suggestion of the company that at the end of this period the rates could be changed if the company could prove before an impartial referee that they are necessary and yet give the city the right to purchase the railway at the end of the five years.

Five-Cent Fare to Be Tried in Jersey

Public Service Railway, Although Doubtful of Outcome, Withholds Request for 10-Cent Rate to Adopt Suggestion of Public Service Commission—New Fare Effective Oct. 1

A 5-CENT fare is to be charged within city limits by the Public Service Railway of New Jersey for a trial period of four months. In general this rate will apply only within the city limits of the larger communities. Beyond the city limits to the end of the original 8-cent zone another 5 cents will be charged. Beyond that 8 cents will be charged in each zone. Transfers will be issued for 1 cent only on the 8-cent lines. Announcement to this effect was made by the company on Sept. 27. Action by the company to this end was taken on the suggestion of the Board of Public Utility Commissioners. President McCarter says he entertains grave misgivings as to the financial results of the plan, but indicates in his letter of acceptance of the suggestion that he desires to co-operate fully with the board.

Almost co-incident with the resumption of service by the company on Sept. 20 it filed with the board a tariff to become effective on Oct. 11, calling for a 10-cent fare. This request was met by the commission on Sept. 25 by a letter suggesting a trial for four months of the 5-cent fare within the city limits of Newark, Jersey City and other large communities. It is this suggestion which the company has now acted favorably upon as indicated in the following letter from Mr. McCarter:

> Public Service Railway has given serious consideration to the recommendation made by the board with reference to fares in its communication of Sept. 25, proposing a 5-cent fare for the congested centers of the larger cities without transfer, and an additional 5-cent fare without transfer to the present 8-cent fare limits of those cities.
>
> While the company entertains grave misgivings as to the financial results of the plan, nevertheless, desiring as it does to co-operate with the board and in the hope that the plan suggested points the way to the ultimate solution of the transportation difficulties confronting the company and traveling public of New Jersey, the company accepts the suggestion of the board in the spirit in which it is offered and will go along with a trial of the rate proposed for period of four months or shorter time as may clearly indicate to the company and the board the results thereof.
>
> In doing this the company will rely upon the active co-operation of the board as offered in its statement in curtailing and limiting wasteful and unnecessary competition and further seeks the co-operation of the board in helping it to obtain relief from municipal paving obligations founded upon archaic conditions inherited from horse car days.
>
> For the rate recommended by the board to be successful, two things must be accomplished. The company must have more revenue arising from the transportation of a very much larger number of passengers which a curtailment of uneconomic and wasteful competition will produce, and its operating expenses must be kept down to the minimum. This latter desideratum can be substantially assisted by relieving it from burdensome paving obligations.
>
> A hearty support of the plan by the public will go a long way to make the trial a success and thus insure the permanency of the rate.
>
> In furtherance of and pending the trial of the rate proposed by the board, the company hereby withdraws the proposed rate filed by it on Sept. 21 with the Board of Utility Commissioners.
>
> The company herewith files the following rate for transportation over the portions of its system enumerated below, effective Oct. 1, 1923, subject only to obtaining a permissive order from the United States District Court.
>
> Fare conditions not specifically hereinbelow referred to to remain for the present as they now are. All reference to municipal boundaries relate to present existing lines and not to any future extensions or modifications thereof.

In its reply to the company the board expresses the hope that the acceptance of the present plan will meet the approval of the public and will, in a measure at least, dispose of the present unsettled conditions in the transportation problems of the state. It says:

> The board acquiesces in your proposal to put the rate suggested by the board into effect on Oct. 1, next, as we deem it desirable that the public should have the benefit of the new rate at as early a date as possible.
>
> The board reiterates its declaration, contained in its statement to you of Aug. 8 last, and again in its later proposal which you have just accepted, that, in its judgment, ruinous auto bus competition should be reduced to a minimum and will, as heretofore declared to be its policy, regulate bus competition in accordance with the statute and to the fullest extent consistent with adequate service.
>
> We note your request for the co-operation of the board in obtaining relief from "paving obligations founded upon archaic conditions inherited from horse car days."
>
> The board agrees that these paving obligations are, under present-day conditions, an undue burden unnecessarily passed on to the riding public through the rate of fare charged.
>
> The board has no power under the existing law to relieve the company of these exactions but will recommend legislation for relief therefrom.

The schedule of places where the fare will be 5 cents was affixed to a statement that Mr. McCarter submitted to the commission. The text of the schedule relating to the northern half of the State—the remainder of the document pertaining only to the Camden lines—was as follows:

DETAILS OF PLAN

A 5-cent fare for a single ride without transfer:

1. Within the limits of the city of Newark (except the existing fare limit to Port Newark Terminal), Harrison, East Newark and on Kearny avenue in the town of Kearny.
2. Within the limits of the other municipalities in Essex county served by the company (except Verona, Caldwell and the Eagle Rock line).

IN HUDSON COUNTY

3. Within the limits of Jersey City and Hoboken.
4. Within the limits of the City of Bayonne.
5. Within the limits of the remaining municipalities in Hudson County not hereinbefore specifically mentioned (North Hudson) served by the company and lying east of the Hackensack River.
6. Within the limits of the town of Kearny between Schuyler Avenue and the Hackensack River and between the Passaic and the Hackensack rivers.

PASSAIC LINES AFFECTED

7. Within the limits of the city of Paterson, Haledon and Totowa.
8. On the Hawthorne line from the Paterson city line to the Passaic county line.
9. On the Singac line from the Paterson city line to Singac.
10. From the Paterson city line through a portion of the city of Clifton and the city of Passaic to the Passaic river and the Passaic city line at Romaine avenue.
11. On the Paterson line from the southerly Passaic city line to the Essex county line.

BERGEN COUNTY LINE

12. On the Palisade line in the county of Bergen from the Hudson county line to Palisade Junction.
13. Within the limits of the city of Elizabeth.
14. Within the limits of the boroughs of Roselle and Roselle Park.

The proposed increase in fares to 10 cents as contained in the original proposal submitted by the company to the Board of Public Utility Commissioners was intended to provide as follows:

> Where 8 cents, or 7½ cents by use of tokens is charged, a charge of 10 cents; where 3 cents is now charged a charge of 5 cents; a charge of 5 cents for school tickets; where 1 cent is charged for a transfer, a free transfer.
>
> Reasons given are: The railway company needs additional revenue to provide for the increase wage to its employees; to furnish safe, adequate and proper service; maintain property and equipment, and provide a fair return on the value of its property.

The company further explained in a letter accompanying the tariff:

> The changes which have occurred making it necessary to obtain an increased revenue are:
>
> The extra increase of approximately 20 per cent in wages paid its employees, which will amount to $2,500,000 a year.
>
> The necessity of inducing the investment of capital in the business and its continuance therein, in order to keep pace with the requirements of the public.
>
> The present rates of fare charged by the railway are unjust, unreasonable and insufficient to allow the company to conserve its property and to enable it to maintain its financial integrity and furnish adequate and proper service to the public, and the proposed rate herewith filed is a just and reasonable rate and necessary to enable the railway company to furnish safe, adequate and proper service to the public.

It was the filing of this schedule by the company that led to the 5-cent fares suggestion from the commission. In its reply to the company on this matter the commission said:

> The board has received from you a notice of intention to increase the street railway fare to 10 cents and has carefully considered your statement and the schedule annexed.
>
> The board appreciates the fact that the conditions under which the company is operating make increased operating costs inevitable.
>
> To deny it the right to obtain sufficient revenue to meet these costs would be a gross injustice.
>
> To raise this revenue the company now proposes to increase its fares to 10 cents.
>
> Whether such an increase would meet the situation at this time, particularly in view of existing auto bus competition, is open to serious question.
>
> This board has in the recent past, and after expensive hearings, although under a lower wage scale, decided against an application for a 10-cent fare.
>
> The board feels that it should not approve such a fare unless it appears upon further hearing that this is necessary to meet existing conditions.
>
> In your recently proposed plan you claimed the elimination of bus competition would result in lower fares. The board agrees that this competition should be restricted to an extent consistent with adequate service and within the scope of its authority will assist in bringing about this result. It will further seek the co-operation of the various municipalities to that end.
>
> In the board's judgment the time has not arrived when the trolley company, long established and used by some 325,000,000 of riders annually, on your system alone, can be dispensed with. Without passing upon the proposed increase in fare to 10 cents, the board desires to suggest a plan which it feels would place the company on a more equal basis in meeting the competition of the buses and at the same time furnish the public transportation at a fair rate.
>
> If the company insists upon a 10-cent fare, the board cannot deny objectors opportunity to be heard.
>
> Expensive rate hearings in the past have cost the State many thousands of dollars and have resulted in protracted litigation.
>
> To avoid further litigation and expense and for the purpose of trial the board suggests that in lieu of the imposition of the 10-cent fare the company establish a

> 5-cent flat fare, without transfers, within the limits of the larger municipalities, with an additional 5-cent fare for the longer rides to the end of the existing fare limits, and continue in effect the present 8-cent fare throughout the rest of the State for the time being.
>
> If this is acceptable to the company, the board suggests that the company prepare and submit for approval the details of the foregoing in the form of a rate schedule, which schedule, if approved, shall remain in effect for the trial period of four months.
>
> In order to determine definitely whether such a rate would produce sufficient revenues to meet the requirements of the situation it is suggested that the company during this four months period submit monthly reports to the board showing its operating expenses and receipts.
>
> The foregoing idea is suggested with the hope that it will produce sufficient revenues to enable the company to operate efficiently and not impose an undue burden on the public.

One of the suggestions made during the period of the cessation of service by the railway was that the Legislature be called in special session to consider what could be done in the emergency that the withdrawal of service had created. On Sept. 19 Governor Silzer declined to summon the State Legislature in special session. Without specifically referring to the Public Service agreement to resume operations, the Governor commented upon the sportsmanlike attitude of the riding public in enduring the inconvenience of the tie-up since Aug. 1. He said the citizens will be glad to know the sovereignty of the state over the corporation has been established. Discussion of "plans" may well wait resumption of service, the Governor pointed out, the principle of the legal fight outweighing other considerations.

Pershing Square Subway Plans Temporarily Abandoned in Los Angeles

Pershing Square, Los Angeles, may be abandoned as the site for the proposed underground terminal. This is indicated by the latest developments in connection with the plans for Los Angeles' proposed subway system for handling local as well as interurban car lines in the city. Announcement to this effect was made after conferences held between engineers of the city and representatives of the two traction companies interested in the project.

The latest plans projected by the city are along the lines of a loop system with frequent entrances in a wide district downtown. It was brought out in the conference that the general opinion of all concerned was in favor of the abandonment of plans for a central station and that the loop system should be substituted, as it was considered that Pershing Square, having an area of some six acres, would not be large enough for a central station, because of the city's ultimate development.

It is intimated that if the loop plan is adopted it is possible the city of Los Angeles will finance the subway system.

The city would construct the subway system and lease it to the railways, thus eventually recovering the investment. The city takes the attitude that a terminal station under Pershing Square or elsewhere in the city would be sufficient for the Pacific Electric Interurban Lines at the present time, but would not be large enough in years to come. It is believed that if the city would finance the larger project, such as the loop system, there would be less chance of congestion and faster and more convenient service to the public.

The Long Beach, Pasadena, Hollywood and west beach trains of the Pacific Electric would enter from more or less the same directions those lines now follow on the surface, but as subway or elevated as convenience demanded. The city's engineering forces propose to prepare plans covering the proposed loop system, to be submitted to the railways for their consideration.

Schenectady Men Declare Strike Off

Thirty former employees of the Schenectady Railway have declared themselves to be strikers no longer and are planning to make application to the Schenectady Railway for reinstatement. They are said to have declared that they were denied the right of holding a special meeting to vote on the question of formally declaring off the strike, which was begun on May 16.

A statement signed by twenty other former employees of the company set forth the opinion that the strike should be declared off. On the ground that this group of thirty men represents close to a majority of the old men out of work and still on strike, the thirty men declare they have effectively ended the strike and that contrary action taken by those who disagree with them will be the action only of a minority.

The Public Service Commission of New York State on Sept. 7 directed its counsel to commence an action in the courts against the Schenectady Railway to recover penalties for failure of the company to comply with the requirements of an order adopted by the commission on April 4, 1923. The order required the company, among other things, to secure and place in operation prior to Sept. 1, 1923: Six new interurban cars for use on its interurban lines, twelve double-truck city cars for use on its lines in Schenectady, one double-truck snow plow and one ice-chopping machine.

Under date of Aug. 31 the company reported to the commission its compliance with certain paragraphs of the order, but did not report the purchase of the twelve new city line cars, and the action to be instituted by the commission will be based upon the failure of the company to purchase such additional cars for use within the city.

The order of April 4 was the result of an investigation by the commission as to the service being rendered by the Schenectady Railway and filed complaints to the commission from the Mayor of the city and patrons of the railway lines.

In the report which the company made to the commission on Aug. 31 the company stated that its failure to comply completely with the order of the commission was due to the strike of its employees because of which the company had been compelled to form almost an entirely new organization for the operation of its line. This report further stated: "The present equipment of the company is more than adequate to meet the traffic demands upon it and as demands increase the equipment will be increased to meet such demands. The company will report from month to month its progress in carrying out the provisions of the order of April 4, 1923."

Seattle Municipal Line Seeks Relief from Paving

Agitation is making headway which has for its object a plan to relieve the Seattle Municipal Railway of the burden of paving. The matter is now up to the City Council. The utilities committee of that body has already recommended to the full body that the policy be adopted of charging the cost of paving right-of-way to the general fund. As a first step in this program it has been recommended that immediate relief be extended to the railway from expenditures of $10,000 to cover half a dozen right-of-way jobs and of $5,800 to cover proposed re-decking of a bridge on Boston Street. Members of the committee hold that tacking these costs onto the railway lines is a relic of the days when such charges were regarded as part payment for franchises. George F. Russell, superintendent of public utilities for the city, has cited fourteen cases of similar relief from paving burdens extended to privately-owned railways as indicating the tendency of the times in connection with this matter. The present ordinance relating to the paving streets provides that the maintenance and repair of all street railway rights-of-way shall be borne by the street railway system "unless other provision shall be made therefor by the City Council by ordinance."

Recommends Review of Rochester Appraisal

In its report on the operation of the Rochester, N. Y., street railways, the Municipal Research Bureau on Aug. 22 recommended a judicial review of the appraisal of the lines in the city of the New York State Railways, under the service-at-cost contract under which the system is now operating. The City Council and Mayor are studying this report.

Among the other recommendations made in the bureau's report is the use of one-man cars on the Sodus Bay interurban line and on non-paying city lines. The report declares that "the appraisers returned a valuation at peak prices for a brand-new plant very much above the pre-war scale," and while commending the service-at-cost plan, proposes a court review of the valuation under which the company now receives its revenues.

James F. Hamilton, president of the New York State Railways, defends the present valuation as equitable and is confident that the appraisal fixed at $19,216,000 some time ago would be found to be less than the actual value of the property today.

Richmond Way Cleared

Prospects for Successful Negotiation of Blanket Franchise Improved by Legal Opinion

The controversy between the city of Richmond and the Virginia Railway & Power Company over the awarding of a new franchise, petition for which has been before the city for several years, bids fair now of finding a solution. The last point of contention between the company and the municipality has just been settled by an opinion by City Attorney James E. Cannon. The opinion is to the effect that the municipality, not the State Corporation Commission, has the right to fix fares on lines running within the city.

The company is operating under franchises granted a multitude of corporations consolidated years ago. These franchises begin to expire in 1925, although one of the major franchises of the lot, that awarded the Richmond Passenger & Power Company in 1889, does not expire until 1930.

For several years the Virginia Railway & Power Company has been seeking a new blanket franchise and has consistently declined to expend large sums of money in rerouting and extending its service into new territories until it was assured the continued privilege of operation.

The decision, or opinion, handed down by the city attorney was requested by the Council committee on streets as one of the final steps before recommending some action on the franchise. The committee refused to make any recommendation until the City Attorney should render an opinion on the powers of the city to fix fares in the city limits, as it has been generally conceded that the Corporation Commission had been delegated this power, along with many others, by the last General Assembly.

The opinion is considered important in Virginia because it has the earmarks of the ruling case. It traces the legal history of traction proceedings in the Commonwealth since the early days. Many conflicting decisions have been made by the Supreme Court on the right to fix fares, and it will be remembered that the city of Norfolk automatically delegated any rate-fixing powers it possessed to the Corporation Commission some time ago and that the case is under advisement at the present time, following award of a 7-cent fare at once to the Norfolk Division of the V. R. & P. This award was made on the grounds that the valuation submitted by both the city of Norfolk and the company was such that a 7-cent fare should be authorized.

Mr. Cannon holds that not only are the present franchises, requiring a 5-cent fare and six tickets for a quarter, binding in every respect, but that the city can enter into another franchise fixing fares within the city limits and that such a contract would be binding and valid until the General Assembly should provide otherwise.

Further, Mr. Cannon is of the opinion that the city has the right to grant a new franchise while the old franchises are still outstanding. He says in part:

> There is no difficulty on this score. The situation can be fully met by requiring the Virginia Railway & Power Company, by written instrument, to agree, in the event it is not the successful bidder, to sell and convey its property rights and franchise to the successful bidder at its fair value as a going concern, the same to be determined by arbitration unless agreed upon by the grantee and the Virginia company, and by requiring in any event that the successful bidder shall surrender all outstanding franchises to the city.

Before the Council now is a complete summary of the proposed extensions which the Virginia Railway & Power Company plans to make under a blanket franchise. Until a franchise is procured, however, which will protect any investments made and strengthen the borrowing capacity of the company, no extensions are to be made.

Electrification a Help in the Cost of Progress

It is a conservative statement to make, said Charles Pierce Burton in *Harper's Magazine* for September, that at least half, possibly three-fourths, of the railroads in the United States should be electrified purely as a matter of economy and, further, that they would be electrified if money for the improvement were obtainable. In his article, entitled "The Cost of Progress," Mr. Burton tells about the romance of the railroad, but shows the practical struggle for the railroads to equip themselves to take care of the growing production. He says that in terms of money, the answer is billions in expenditure. In terms of railroad betterment, he says there must be enlarged terminal facilities, greatly increased yards, longer turnout tracks to accommodate trains of 100 cars instead of fifty, increased motor power not only in New England but all over the United States, and in many cases increased mileage of track. In terms of public policy, he goes on to say there must be a recognition of the rights, the limitations and the economies of railroad operation. He says the facts can be demonstrated that in the case of the railroad and the public utilities in general the decrease in rates to the public was more rapid before the era of government control and regulation than it has been since.

He believes that the average life of the rolling stock of a railroad is not more than twenty years, and this determines the average life of nearly everything depending on that rolling stock. Very little of the depreciation is due to wear and tear but about half of it is due to inadequacy, resulting from the astonishing growth of the nation. Approximately an equal amount is due to obsolescence, new inventions effecting economies of operation having made the old designs obsolete. It is for this reason that he believes so large a percentage of the railroads in the United States should be electrified on the ground of its economy.

Authority Sought to Extend into Los Angeles Harbor

In the matter of the application of the Santa Fé & Los Angeles Harbor Railway for authority to construct its line of railroad over and across the lines of electric railway between El Segundo and Wilmington Harbor, Los Angeles County, a hearing was held before the California State Railroad Commission in Los Angeles recently.

The Santa Fé line has had the authority from the Interstate Commerce Commission for the construction of this proposed 13-mile extension of its line to tidewater for some time, and it is expected that the California State Railroad Commission will give its authority immediately. The proposed line is intended to be devoted exclusively for freight purposes.

Approximately sixty streets are crossed by the proposed line, whereby six overhead grade crossings, for a total estimated cost of $650,000, will be provided. Two of these separated grade crossings are over the electric interurban lines of the Pacific Electric Railway, while four are over important and heavily-traveled highways. The overhead structures are composed of through girder type and concrete piers and abutments.

The prescribed overhead clearance at point of overhead crossing of the electric lines as called for in the plans and approved by the commission is 23 ft. The terminus of the proposed extension upon reaching Los Angeles Harbor will connect with the Los Angeles City municipal belt line, electrically operated, and the city's belt line will arrange to handle all freight destined to or originating from the proposed extended line.

Three Hundred Copies of Bulletin Go to Bankers

The New England Bureau of Public Service Information has issued the report of its second year's work. The report emphasizes the fact that this bureau of information movement is now a nation-wide one and that all public utility companies in the country with vision are contributing to the support of this work. In the opinion of the New England bureau its importance cannot be overestimated in the development of better public relations. In New England alone nearly 300 copies of the bulletin go each week to investment banking houses and are placed in the hands of security salesmen for their educational value.

The director of the New England bureau in the report makes mention of the splendid help and co-operation given the bureau by the national associations—the National Electric Association, the American Gas Association and the American Electric Railway Association—and the executives of the different telephone companies of the Bell Telephone system throughout the country, with whom he has been in frequent communication during the year.

Large Program of Construction on Electric Lines Announced

General Manager E. W. Oliver of the electric railway lines owned by the Canadian National Railways announced at Toronto on Sept. 25 plans for the construction of certain sections with a view to linking them up with the existing electric lines in the Toronto and Niagara district.

The plans include construction of a portion of the new Toronto and Suburban entrance into Toronto, the tenders for which will be called soon; the completion of this entrance to a terminal to be located on St. Clair Avenue near Prescott Street in the west end of the city by next spring, rehabilitation and electrification of the old Belt Line across the north end of the city to the Don Valley in the east, completion of the construction of the Toronto and Eastern electric line between Bowmanville and Pickering by next spring, electrification of the C.N.R. steam line from King Street to Scarboro Junction by next fall, the erection of stations at Yonke, Bloor and King Streets and the installation of twin passenger elevators at the Bloor Street viaduct in order to permit passangers to descend from the viaduct to the line running from King Street to Scarboro. The location of the connecting link between Scarboro and Pickering is still undecided, but Mr. Oliver expected to make an announcement on this point upon the return of Vice-President S. J. Hungerford of the Canadian National Railways from western Canada shortly.

Mr. Oliver expected an hourly service would be given between Toronto and Bowmanville on the Toronto & Eastern Railway.

Headquarters Moved.—The offices of the Public Trustees of the Boston Elevated Railway have been moved from 108 Massachusetts Avenue to 31 St. James Avenue, Boston, Mass.

Agreement Reached with Shop Employees.—The United Railways, St. Louis, has reached wage agreements with 500 of its 1,000 shop employees, granting them increases of from ¼ cent to 3 cents an hour. Among the men included in the advance are carpenters, painters, blacksmiths, car builders, machinists, metal workers and helpers.

Six-Cent Increase Granted.—A new wage scale, retroactive since Aug. 1, was agreed upon by motormen and conductors at a meeting in Danville, Ill., to consider the contract offered the men by the Danville Street Railway & Light Company. The new scale provides for a 6-cent an hour increase for employees in the service for two years or more.

Favors Abolition of Grade Crossings.—Mayor Curley of Boston has written to Col. Thomas F. Sullivan, chairman of the Transit Commission, urging the abolition of various grade crossings in Dorchester. The Mayor is in favor of depressing the road and building bridges. He believes that this course would be for the best interests of the city.

Additional Service Provided. — Another indication of the rapid growth of Graham, Va., is shown in the necessity for additional street car service. The Princeton Power Company has found it necessary to put the second car in service between Graham and Bluefield during the afternoon hours and all cars are crowded during the evening hours. Business is being built up rapidly on the west end line.

Utility Men to Entertain You.—Listen in on Oct. 4 any time from 7.30 p.m. to 8.55 p.m. to hear the musical program which will be presented by the Kentucky Committee on Public Utility Information over broadcasting station "WHAS." This will be made possible through the courtesy of the Louisville *Courier-Journal-Times*, located at Louisville. If you want to hear "Barney Google" as you never heard it before just listen for the Louisville Railway Inspectors' Quartette. Other talent will be furnished by the Louisville & Interurban Railroad, the Cumberland Telephone & Telegraph Company, the Louisville Gas & Electric Company and the Louisville Home Telephone Company. A brief talk will be given by L. B. Herrington, vice-president of the Kentucky Utilities Company. This committee, it is said, has the distinction of being the first of its kind to broadcast a complete program over radio. Further interest attaches to the program because of the fact that all the participants are employees of public utilities in the state of Kentucky.

Commission Urges Increase of Pay to Tramway Employees.—The Colorado Industrial Commission recommends a wage increase ranging from 4 to 7 cents an hour for the employees of the Denver Tramway in the wood, armature, paint, machine and blacksmith departments. Since the strike of two years ago the company has treated with grievance committees from the men, but in this case it seems that there could be no agreement between the committee and the rest of the men, hence the case went to the industrial commission. The decision of the commission is based upon the wages paid similar workmen by other concerns.

Another Publication Appears.—"Current Topics" is the name of a new magazine which will appear every month by, of and for the employees of the Illinois Power & Light Corporation, the Illinois Traction, Inc., and the North American Light & Power Company. The words "by, of and for" express the purpose of the new employees' magazine. This is to make possible the interchange of views and news between employees and departments of the Illinois Power & Light Corporation and its subsidiary companies. The first issue of "Current Topics" appeared under date of August, 1923. It is a twenty-four-page pamphlet, telling about the company's activities at its various divisions. The editor is E. E. Soules.

Assigns Franchise Rights.—The Public Service Commission, under date of Sept. 7, made an order approving the assignment to George Bullock, as receiver of the Buffalo & Lake Erie Traction Company, of certain franchise rights now held in the city of Dunkirk by the Dunkirk Street Railway. These rights permit the construction and operation of a street surface railroad in the city of Dunkirk. The order also approves the abandonment by the Dunkirk Street Railway of certain portions of the constructed line. Hearings were recently held in Buffalo on the matter and no objections were presented from any source to the above order being made.

Amusement Park Burned. — Sea Breeze Amusement Park, on Irondequoit Bay, 7 miles northwest of Rochester, N. Y., owned by the New York State Railways, was swept by fire recently with the result that a part of the resort was reduced to ashes. The total loss is put at $150,000, of which only a small part will be borne by the railways as the buildings destroyed were owned by private amusement concerns. The fire is believed to have been of incendiary origin. The sheriff's office and the railways are conducting an investigation. Bertram E. Wilson, general passenger agent, said that the resort would be kept open for the rest of the season as the northern half was not injured by the flames.

Wages Increase Three Cents.—The board of arbitration appointed to set wages for employees of the East St. Louis & Suburban Railway handed down a decision on Aug. 6 increasing wages of the employees, including motormen, conductors, shop and shed men, 3 cents an hour. The top rate for city motormen and conductors is set at 54 cents an hour after eighteen months, and the top rate for interurban motormen and conductors is set at 56 cents an hour after eighteen months. The decision was signed by Edward A. Raithel, chairman of the board of arbitration, and C. E. Smith, member representing the companies. The member representing the employees did not sign the award, and up to Aug. 30 had made no report either assenting or dissenting.

Association Benefits by Lost Unclaimed Property.—The Employees' Benefit Association of the Brooklyn-Manhattan Transit Company received this year $2,577, which was turned over to it on July 11 by the cashier of the company, as a contribution from the cash proceeds of the disposal of the unclaimed property assembled during the year by the lost property department. This amount included the net proceeds resulting from the auction of unclaimed articles on July 6 and also the sum of $1,751 in cash which was never claimed by the persons who left it on the company's cars or in the stations. In compliance with the provisions of the general railroad laws of the state of New York, the money realized from the property left in cars and stations is turned over to the Employees' Benefit Association.

Foreign News

The First Russian Tramway Conference

A tramway conference was called in December, 1922, to investigate the state of Russian city lines to determine general measures for improvement.

At present there are in Russia thirty-six electric tramways. Of this number twenty-seven sent complete reports to the conference. The total number of cars is 4,778; 44 per cent of this number, i.e., 2,096 cars, are reported as totally unusable. In some particular cities the number of unusable cars is as high as 92.5 per cent, in seven cities from 50 to 60 per cent. Part of the stock is now used not for passenger traffic, but for transportation of goods, mostly belonging to the government. During the years of civil war, in certain cities the passenger traffic was considered of secondary importance as compared with the transportation of materials. Therefore, only 32 per cent of the total number of cars was used for passenger traffic. In a number of cities the passenger traffic was stopped for months; in two cities for three years. The cause of interruption, as reported, is the lack of materials, repair parts and in some cases of fuel.

During part of the time between 1918 and 1922 the passenger traffic was free of charge. At present almost everywhere fare is collected quite accurately. Improvement began in 1921 and is gradually increasing.

The cause of lack of materials and of repair parts as reported is not the lack of them in the country, but the lack of money to buy or make them.

Part of the time the tramway enterprises were almost without any income, traffic was declared free of charge and no other sources of income were available. This was ameliorated only after the government accepted the so-called new economic policy, giving permission to collect fares and to organize the operation of tramways on a commercial basis. As drawbacks in this respect are reported:

1. In some cities the tramway is not separated from other enterprises, which means that the income from tramways is included in communal city treasury and is spent for other purposes; the expenses allowed for tramway are in no way proportionate with its income.

2. In other cities, where tramway operation is organized as an independent city enterprise, the communal taxes are too high. For instance, Samara reports the expenses as follows:

Labor and social insurance, 55 per cent of the total expense.
Taxes, 13 per cent.
Electric energy, 25 per cent.
Materials, etc., 7 per cent.

Labor and social insurance is more than 50 per cent of the total expense in all tramway enterprises. The charge for electric energy in many cities is another income of the communal household, and part of the expense for energy must be considered as another item of taxation.

At the end of the conference representatives of industry made their statements. Factories formerly owned by private companies are combined at present into a number of trusts. These trusts have special agreements with the government, according to which they are working as before, but under government control and paying a part of their profits to the government. All representatives stated that their organizations have all necessary equipment required for tramways and will be only too glad to handle their requests. They asked members of the conference not to place their orders in foreign countries, but to support Russian industry. The impression of improvement is made.

Only Two Morocco Cities Have Electric Railways

An official bulletin of the French Protectorate of Morocco publishes the terms of a convention wherein there has been accorded to a group of twenty-three French companies the "privilege of the production, transport and distribution throughout Morocco of electrical energy." This concession, its limitations and its scope being taken into consideration, is bound to have an enormous influence in the development of the Morocco of the near future.

Morocco, scarcely open to the European world ten years ago, has at present only two cities—Casablanca and Rabat—where electric railways have been established. Lines will doubtless be established at Marrakech, Mogodor and other of the coast towns, but this is about all for a long time to come.

Municipality of Dijon Makes Up Deficit

The Compagnie des Tramways Electriques of Dijon, France, made the request of the municipality that a subvention be granted to cover a deficit in receipts from operation. The Municipal Council refused categorically and the company carried the matter before the Prefectoral Council of the Department, or county, and demanded an indemnity of 323,856 francs, a sum corresponding to that which the company took upon itself to expend in supplying the city with a service in excess of that which its franchise called for. Various experts were heard on both sides and finally the city was compelled to pay 56,000 francs to the company as well as the expenses of the suit and the costs of witnesses.

The sum involved is small enough, but the case is supposed to present a new phase of relations between a municipality which grants a franchise and in return demands a certain service on behalf of its population. The company met the demands and on various occasions granted additional services for which it claimed reimbursement of its expenses.

London Railway Electrification

The announcement is made that the directors of the London & North Eastern Railway have decided to electrify the suburban lines of the Great Northern section of their undertaking. The route length is about 38 miles and the principal places reached outside of London are Edgware, High Barnet, Hatfield and Cuffley. Details are being worked out.

Electric Railway to Beach at Ostia

The projected and long-looked-for electric railway which was to take the Romans to their bathing beach of Ostia, Italy, was expected to come into being this summer. It has been looked for every year for the past twenty years, but has not yet become a reality. The line is only 15 km. in length and will cut the journey which is now accomplished by the main line railway in half. It is now proposed to start the line in the near future.

Barcelona's Subway and Labor Troubles

When the Catalan capital of Barcelona first projected its underground railway it was obvious that the work was of a nature which required every possible skill in handling. Actually the underground part of the street railway system of Barcelona is the connecting link which passes below the center of the city, coupling up the surface lines of the outlying portions. In every way this offers a really rapid service from one side of town to the other.

For some months past Barcelona has been in the throes of a labor conflict, which has affected almost every industry and enterprise. Work on the subway was paralyzed for months, but during the past month the company has found a sufficient number of non-syndicated laborers to proceed with a greater activity than ever.

The London Experimental Cars

The six experimental cars for the London tube railways, which were described in a recent issue of the ELECTRIC RAILWAY JOURNAL, having completed their tests on the Great Northern & Piccadilly Railway, have been transferred by road to the Charing Cross & Hampstead Railway, where they will undergo a further trial. It is hoped to open the first part of the extension on the latter railway about the middle of October and for this reason passengers on the Hampstead line are to be given an opportunity to get accustomed to the new rolling stock (200 cars in all) which is on order for this and the City & South London Railway, and which is similar in many respects to the experimental cars. It is found that the three double doors on each side of these cars produce a saving of six seconds at each station stop.

Financial Notes

Preferred Stock Offered.—A syndicate headed by Greenshields & Company, Toronto, Ont., is offering $550,000 of the 7 per cent cumulative preferred stock of the Jamaica Public Service Company, Ltd. The price is 95 to yield 7⅜ per cent.

Seeks Partial Abandonment.—The Southern New York Power & Railway Corporation has asked the Public Service Commission for approval of abandonment of a portion of its Oneonta system. The company says that this part of the system is no longer necessary for the convenience of the public.

Auction Sales in New York.—At the public auction rooms in New York on Sept. 26 there were sold $1,300 of the Valley Traction Company's first mortgage 5 per cent gold bonds, due 1933; interest April and October 85⅛ per cent. The Valley Traction Company is part of the Valley Railways, Lemoyne, Pa.

Permits Dismantling.—Israel Joseph, who some months ago bought the Chicago, Aurora & De Kalb Electric Railway, Aurora, Ill., can resume work of dismantling the road. Judge Fulton at Geneva recently refused to make permanent the temporary restraining order obtained against Mr. Joseph by the Illinois Commerce Commission. Mr. Joseph paid $90,000 for the property.

Conspectus Figure Corrected.—Albert S. Richey calls the attention of this paper to a slight error in one of the index figures for September, 1923. As contained in The Conspectus of Indexes compiled by him and published in last week's issue of the Electric Railway Journal, and also in the postal card form, the average street railway fare was given as 7.00 cents. This should have been 6.95 cents.

Passes Dividend.—The directors of the United Electric Railways, Providence, R. I., have decided to pass the quarterly dividend of 1 per cent due at this time. The company succeeded to the properties of the old Rhode Island Company. Earnings of the company have been a cause of disappointment since starting the 5-cent fare in January. This fact, together with the unusually heavy operating expenses through the winter and spring, has been responsible, it is said, for the company's decision with respect to the 1 per cent quarterly dividend.

Securities for Reorganized Company Approved.—The application for the approval of the purchase of the former Michigan United Railways by the Michigan Electric Railway has been acted upon favorably by the Michigan Utilities Commission. The commission has also authorized the new company to issue approximately $17,000,000 in new securities under terms of the plan approved a few months ago. The new securities will consist of 98,750 shares on non-par common stock of which 1,250 shares will be sold at not less than $20 a share; $6,300,000 cumulative 5 per cent preferred, class "A"; $400,000 non-cumulative 5 per cent preferred, class "B"; $1,203,800 non-cumulative 5 per cent preferred, class "C," and $6,590,500 first and refunding 5s of which $600,000 are to be presently sold at not less than 85, distribution of balance of securities to be in accordance with plan agreed upon between bondholders' committee some time ago.

Transportation Notes

P.R.T. Starts Roosevelt Boulevard Buses

Bus service was started by the Philadelphia Rapid Transit Company on Roosevelt Boulevard on Sunday, Sept. 23. This is the first attempt by the company at a scheduled bus service on a uniform basis co-ordinated with the city's established transportation system. For the present the open-top type of double-deck bus will be used, pending further study of the semi-inclosed top vehicle. Ten machines are in operation throughout the day, with more running in the rush hours to provide additional service. The vehicles are operated on the basis of a seat for every passenger. The present plans of the company are to establish a bus service to the central business district from the West Philadelphia section so as to relieve the surface and the elevated lines serving a part of that territory. The plans call for bus operation from Sixty-third and Walnut Streets to Broad and Sansom Streets. Thomas E. Mitten, chairman of the board of the company, says that the Roosevelt Boulevard bus service is only the forerunner of an almost city-wide bus service which is to come.

◆

Recommends Zone System.—James Dalrymple, general manager of the municipal railway lines in Glasgow, Scotland, recently visited Superintendent D. W. Henderson of the Seattle Municipal Railway lines and suggested that the Seattle municipal lines start the graduated fare system, governed by zones, similar to the one used in Glasgow. Mr. Dalrymple has been visiting on the coast, but plans as part of his return journey to attend the coming convention in Atlantic City.

Wants Ten-Cent Fare.—The Dover, Somersworth & Rochester Railway, Dover, N. H., has petitioned the Public Service Commission for a 10-cent fare, thus doing away with the permits and tickets. In the month of June the company filed a petition with the Public Service Commission to issue permits for $1 each, which entitled the owner to ride on any fare zone for 5 cents. At that time the company offered strips of tickets, seven in number, for 50 cents, while the cash fare was 10 cents for each fare zone for persons without the permit or tickets. The company's intention now is to withdraw these permits at the end of this month and to operate entirely on a 10-cent fare basis.

Personal Items

Personnel Changes in Macon

L. A. Magraw, formerly general manager and treasurer of the Macon Railway & Light Company, Macon, Georgia, was made vice-president of the company on Sept. 20, retaining his position as general manager but relinquishing that of treasurer to W. E. Hauser. R. Frank Jones was appointed secretary and assistant treasurer and J. Clay Murphy and W. E. Dunwoody were elected to the board of directors of the company.

The changes were made by the board of directors at the regular annual meeting and are in line with the expansion program outlined for the Macon utilities companies during the coming year.

◆

K. R. Lewis, formerly engineer of equipment with the International Railway, Buffalo, N. Y., severed his connection with that company on Sept. 1. Mr. Lewis is now general foreman, electric repair, of the Interborough Rapid Transit Company in New York City.

Fred C. Morton, formerly assistant to the manager of the Savannah Electric & Power Company, is now general superintendent of that company. The Savannah company is under the management of Stone & Webster, Inc., with which organization Mr. Morton has been associated since his graduation from the University of Maine in 1908.

Paul S. Duenweg has been appointed general superintendent of the Houston Electric Company. He has been maintenance of way engineer for this company for the past six years. Prior to that time he was connected with the Galveston Electric Company for several years, and was also on construction work for Stone & Webster, Inc., Boston, Mass., general managers of both companies.

Obituary

A. J. Gadoua, acting superintendent of transportation, Montreal Tramways, died recently at the Notre Dame Hospital in Montreal. He was born at Sherrington, Que., in 1871. Mr. Gadoua entered the company's service in 1891 as a horse car conductor, and after the system was electrified he was appointed inspector. Later he was put in charge of the St. Denis shops. He served in Paris, France, under the late Duncan McDonald, general manager Paris Tramways, and on returning to Montreal in 1907 was appointed claim agent, Montreal Street Railway, later Montreal Tramways Company. In October, 1922, Mr. Gadoua was appointed acting superintendent of transportation on A. Gaboury's retirement. No successor has yet been appointed to the position left vacant by the death of Mr. Gadoua. C. M. Shaw, assistant superintendent of transportation, is looking after the duties of the department.

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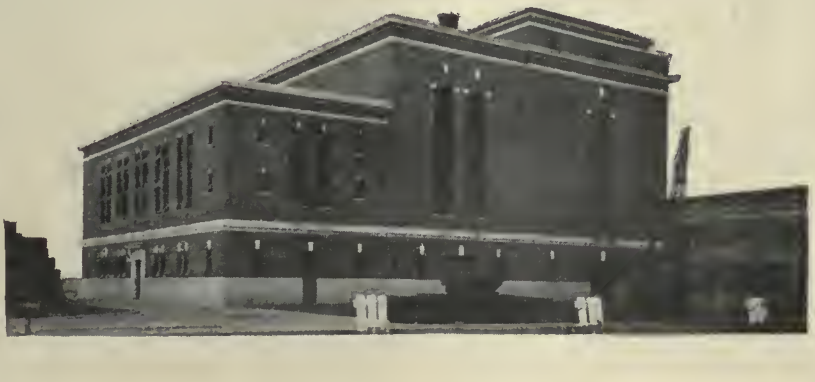

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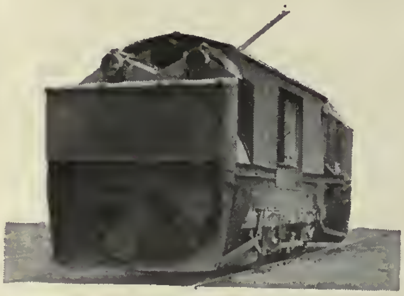

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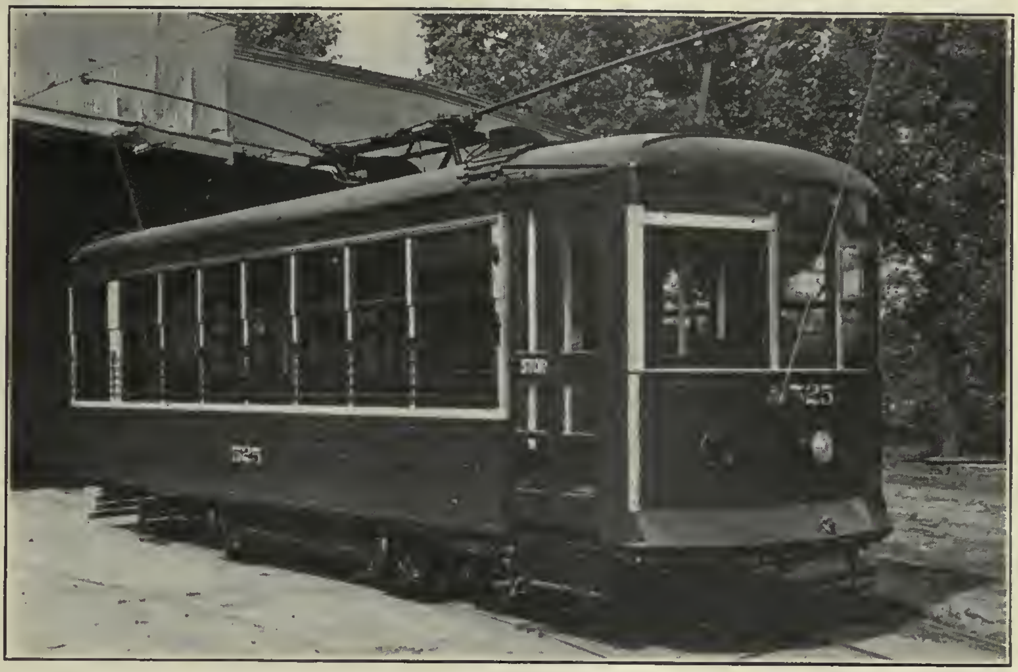

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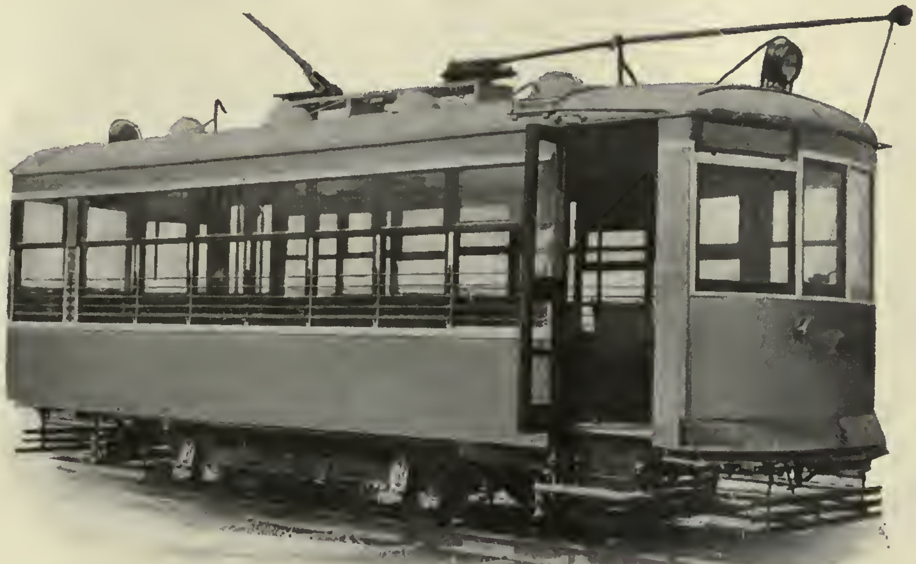

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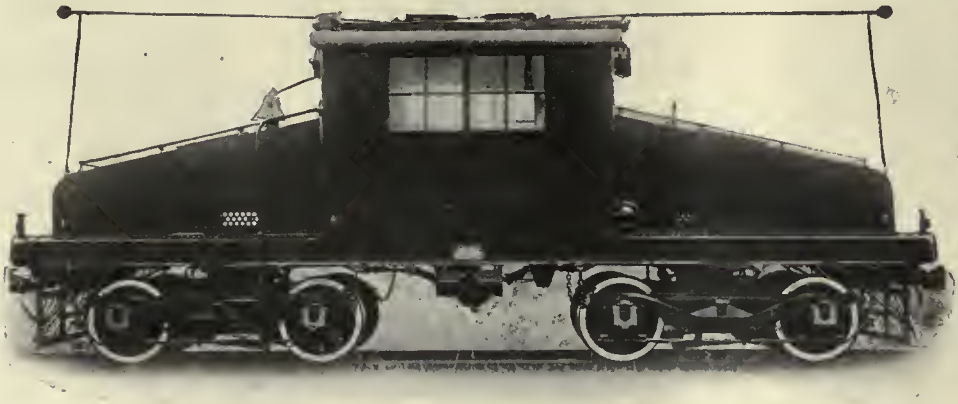
5 50-Ton Locomotives



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ECKLAND BROS. COMPANY
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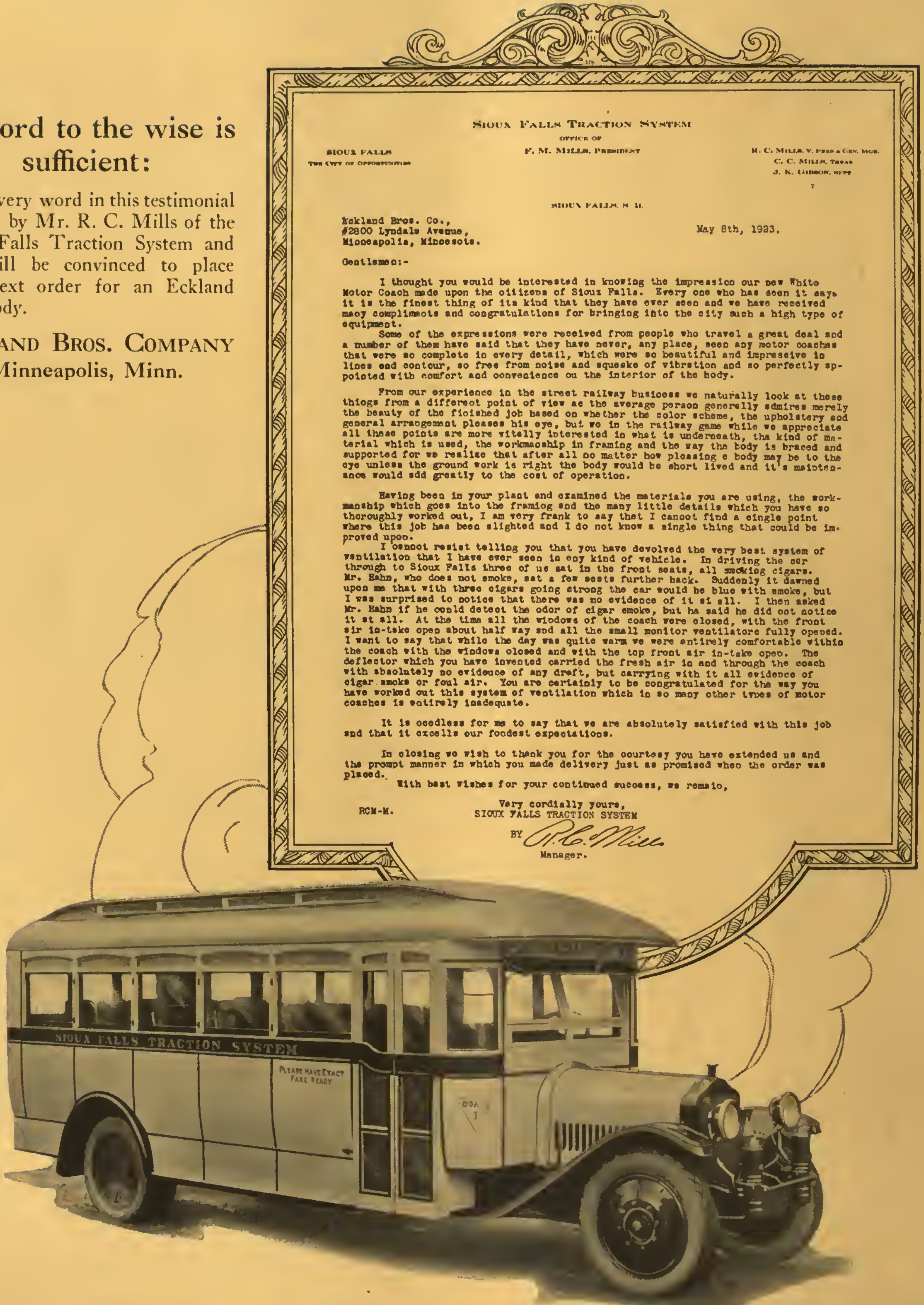

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From our experience in the street railway business we naturally look at these things from a different point of view as the average person generally admires merely the beauty of the finished job based on whether the color scheme, the upholstery and general arrangement pleases his eye, but we in the railway game while we appreciate all these points are more vitally interested in what is underneath, the kind of material which is used, the workmanship in framing and the way the body is braced and supported for we realize that after all no matter how pleasing a body may be to the eye unless the ground work is right the body would be short lived and it's maintenance would add greatly to the cost of operation.

Having been in your plant and examined the materials you are using, the workmanship which goes into the framing and the many little details which you have so thoroughly worked out, I am very frank to say that I cannot find a single point where this job has been slighted and I do not know a single thing that could be improved upon.

I cannot resist telling you that you have devolved the very best system of ventilation that I have ever seen in any kind of vehicle. In driving the car through to Sioux Falls three of us sat in the front seats, all smoking cigars. Mr. Hahn, who does not smoke, sat a few seats further back. Suddenly it dawned upon me that with three cigars going strong the car would be blue with smoke, but I was surprised to notice that there was no evidence of it at all. I then asked Mr. Hahn if he could detect the odor of cigar smoke, but he said he did not notice it at all. At the time all the windows of the coach were closed, with the front air in-take open about half way and all the small monitor ventilators fully opened. I want to say that while the day was quite warm we were entirely comfortable within the coach with the windows closed and with the top front air in-take open. The deflector which you have invented carried the fresh air in and through the coach with absolutely no evidence of any draft, but carrying with it all evidence of cigar smoke or foul air. You are certainly to be congratulated for the way you have worked out this system of ventilation which in so many other types of motor coaches is entirely inadequate.

It is needless for me to say that we are absolutely satisfied with this job and that it excells our fondest expectations.

In closing we wish to thank you for the courtesy you have extended us and the prompt manner in which you made delivery just as promised when the order was placed.

With best wishes for your continued success, we remain,

Very cordially yours,
SIOUX FALLS TRACTION SYSTEM
BY R. C. Mills
Manager.

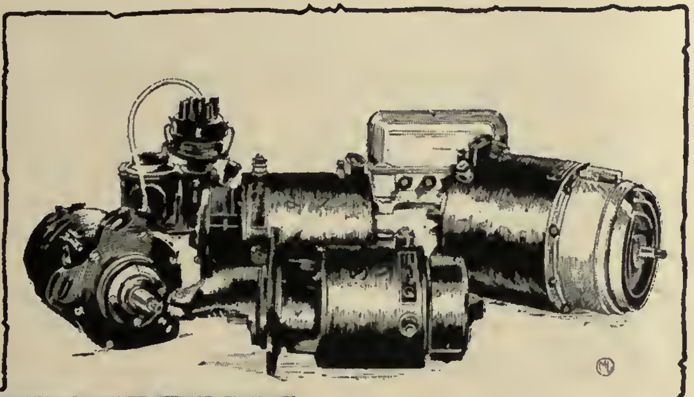
RCM-M.

ECKLAND BUS BODIES

"" *Standardized for Economy* ""

NORTH EAST

ELECTRICAL EQUIPMENT IS USED WHERE DEPENDABILITY COUNTS



North East Electric Lighting, Starting and Ignition Equipment is meeting the requirements of every class of bus service with the same success that it has established in the Passenger Car, Truck, Taxicab and Motor Boat field.

North East Bus Equipment is in use on—

Fifth Avenue Coach
Four Wheel Drive
Gramm Pioneer
Brockway
(For N. Y. State Rys.)
Reo

Yellow Coach
Graham Brothers
Selden
Mitten-Traylor
White

Mack International
(For Connecticut Co.)

NORTH EAST ELECTRIC CO.

ROCHESTER, N. Y., U. S. A.

Manufacturers of

Starter-Generators
Generators
Starting Motors
Ignition Units

Ignition-Generators
Horns
Speedometers
Switches - Regulators

BUSY *BUSY* *BUSY*

The Philadelphia Motor Coach Company

Philadelphia

—is Busy!

BUSY *BUSY* *BUSY*

Too Busy—

for a long advertisement.

To build a "special convention"
sample bus.

To have pretty pictures taken
to send you.

BUT—

We have built a real

MOTOR COACH

to carry passengers.

First Fleet Starts Operation

November 1, 1923
in Philadelphia

See them—Ride on them—and
Let them tell you.

They speak your language.

Various types of White Busses adopted by leading electric lines will be on display at the American Electric Railway Association Convention on the Million Dollar Pier, Atlantic City, October 8-13.

WHITE

Assuring continuous sustained
transportation everywhere

Moving people has become the twin problem of moving materials

TO facilitate the movement of millions is a problem of deeper significance than the promotion of any one means. Transportation is one sympathetic system.

Railroads opened the way to all America. Added to them, street cars, subways and elevateds made it practical and convenient to live and work in crowded cities. And now, with increasing demands on these, modern motor bus transportation, carrying on over streets and highways where rails can't go, supplements, feeds and binds together our whole passenger transportation system—to make it adequate and enduring.

The motor bus that fits into this greater transportation system obviously is only a vehicle that can satisfy exacting requirements.

White Busses were pioneers. More than 5,000 are in use—more than of any other make. Their use is under conditions where a year's work means 365 days of running. Hundreds have been running for years—in some cases as much as 300 miles a day.

Excepting certain types in New York and London, the largest bus fleets in the world are White. As time goes on, one White Bus after the other demonstrates its unusual utility with a record of 100,000, then 200,000, then 300,000, and even up to 500,000 and more miles. Through the experience of such long and severe tests, the White Bus Model 50 was perfected—to give the speed, power, balance of chassis, low loading height, good looks and comfort which make it what a motor bus should be.

You see White Busses, flexible auxiliaries to rails, playing a big part in handling crowds in cities and in building up intercity travel. You see them standard equipment in the National Parks and a great convenience for visiting playgrounds and resorts. You see them serving communities not otherwise reached and carrying children to and from consolidated rural schools. Along organized routes you can set your watch by a White Bus through all weather.

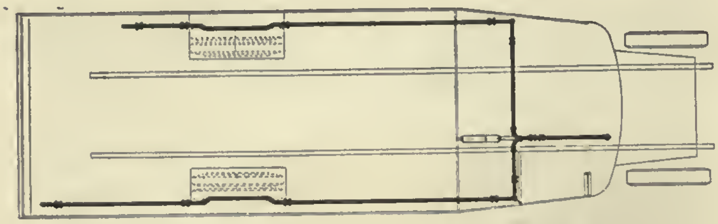
Thus—where rails end, rubber carries on. Rails and highways are effectively joined together.

White Busses, built in the same great plant as White Trucks, came to leadership because of kinship of two growing problems—to move people more comfortably and conveniently and to move materials more quickly and economically.

THE WHITE COMPANY
CLEVELAND

BUSSES

A VITAL QUESTION—THINK IT OVER



IF you build or operate Buses or Gasoline Railway Cars as either "feeders" for Rapid Transit Lines or as a regular line, the vital problem facing you is — Proper Heat. Profits always come to the operator of Well Heated Buses or Gasoline Railway Cars.

See Our Exhibit at Atlantic City
A.E.R.A.—Oct. 8-13

SOME USERS

Ace Motor Company, Camden County, N. J. Bus Association
Fifth Avenue Coach Co.
International Harvester Co.
International Motor Co. (Mack)
Phila. Rapid Transit Co. (for Buses)
Yellow Coach Mfg. Co.

There's only one way to choose a bus heating system — get the most for your money The Petry Bus Heating System offer you more for every dollar you spend than any other system.

Our system is less complicated. It is easier to install. It's lighter in weight than the ordinary iron pipe system. It's made to order for your particular requirements — and it's low in price.

FEATURES: Ample heat. Seamless steel tubing. Smooth joints and angles. Clothing guards. No odors. No smoke. No danger to passengers.

AN ADDED ADVANTAGE: The Tuning-Up Valve, which is part of our system, enables you to tune up your motor every day and locate engine trouble when it is starting—keeps your buses out of the repair shop and on the road.

You cannot ignore the heating question. Write for information or see our exhibit at Atlantic City, October 8th to 13th.

N. A. PETRY COMPANY, Inc.
329 N. Randolph Street, Philadelphia, Pa.
Makers of Petry Tuning-Up Valves, Pedals, Hand Levers, Tire Pumps, Ventilators, Tire Carriers and Dash Controlled Tuning-Up Valves.
Western Distributor: Norman Cowan Co., 445-51 Rialto Bldg., San Francisco, Cal.

THE PETRY BUS HEATING SYSTEM

Why Electric Railway Men Should Be Readers of BUS TRANSPORTATION

From an Editorial in Electric Railway Journal, September 8, 1923

"*Bus Transportation* has based its program on long experience and knowledge in the passenger transportation business, with full appreciation of the desirability and the necessity of encouraging new development to the fullest extent. During its almost two years of existence, it has made a consistent effort to spread the philosophy of co-ordinated rather than competitive services. Railway men should be able to appreciate the value of this paper to them, not only as a service to help them in their own bus enterprises but also as an exponent of sound bus development. And the paper is, for the same reason, of just as great service to the independent bus men, for the philosophy of co-ordination of buses with other transportation lines is best for bus as well as railway. In fact it is the only sound basis on which bus men can develop their service if they hope to create a substantial business. It is just a matter of plain economics, provided a community does not choose to subsidize one form of transportation while penalizing the other."

Bus Transportation **will give you authoritative information regarding bus operation and maintenance, as well as the latest news regarding developments. Cut out and mail this coupon and receive this service regularly.**

BUS TRANSPORTATION
Tenth Avenue at 36th Street, New York, N. Y.

Enter my name on your subscription list at once.

For two years ☐ at $3.00 check here

Name ....

Address ....

City or State ....

For one year ☐ at $2.00 check here

E.R.J. 9-29-23

REG. U.S. Mack PAT. OFF.

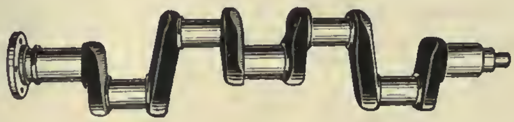
The 27 exclusive features listed are the result of 23 years of specializing in motor transportation. Each one has played an important part in building the reputation which Mack Trucks have established wherever motor trucks are known.

THE
COMPLETE LIST

1— CRANKSHAFT
2— Cylinder Treatment
3— Engine Support
4— Case-Hardened Timing Gears
5— Water-Cooled Oil Reservoir
6— Double-Screen Oiling System
7— Water Pump
8— Exhaust Manifold
9— Intake Manifold
10— Crankcase Inspection Parts
11— Interrupted Spline Shaft
12— Reverse Gear-Shift Lever
13— Steering Wheel
14— Steering Column
15— Steel Cab Sliding Doors
16— Front Sprocket
17— Pressed Steel Radius Rod
18— Blast Cooled Dash Radiatior
19— Beltless Squirrel Cage Blower
20— Single-Rod Gearshift Control
21— Non-Metallic Flexible Clutch Disc
22— Dual Reduction Drive
23— One-Piece Banjo Type Rear Axle
24— Full-Floating Construction
25— Rear Axle Accessibility
26— Drive Shaft Brake
27— Rubber (Shock Insulator) Shackles

Send for illustrated and descriptive literature on all exclusive Mack features listed above.

Exclusive Features



NO. 1. *The* Exclusive Crankshaft

"To give the crankshaft the rigidity it should possess, the three main journals and four crank pins measure 3 inches and 2⅜ inches respectively. These exceptional diameters throughout absolutely *prevent whipping or flexing.*

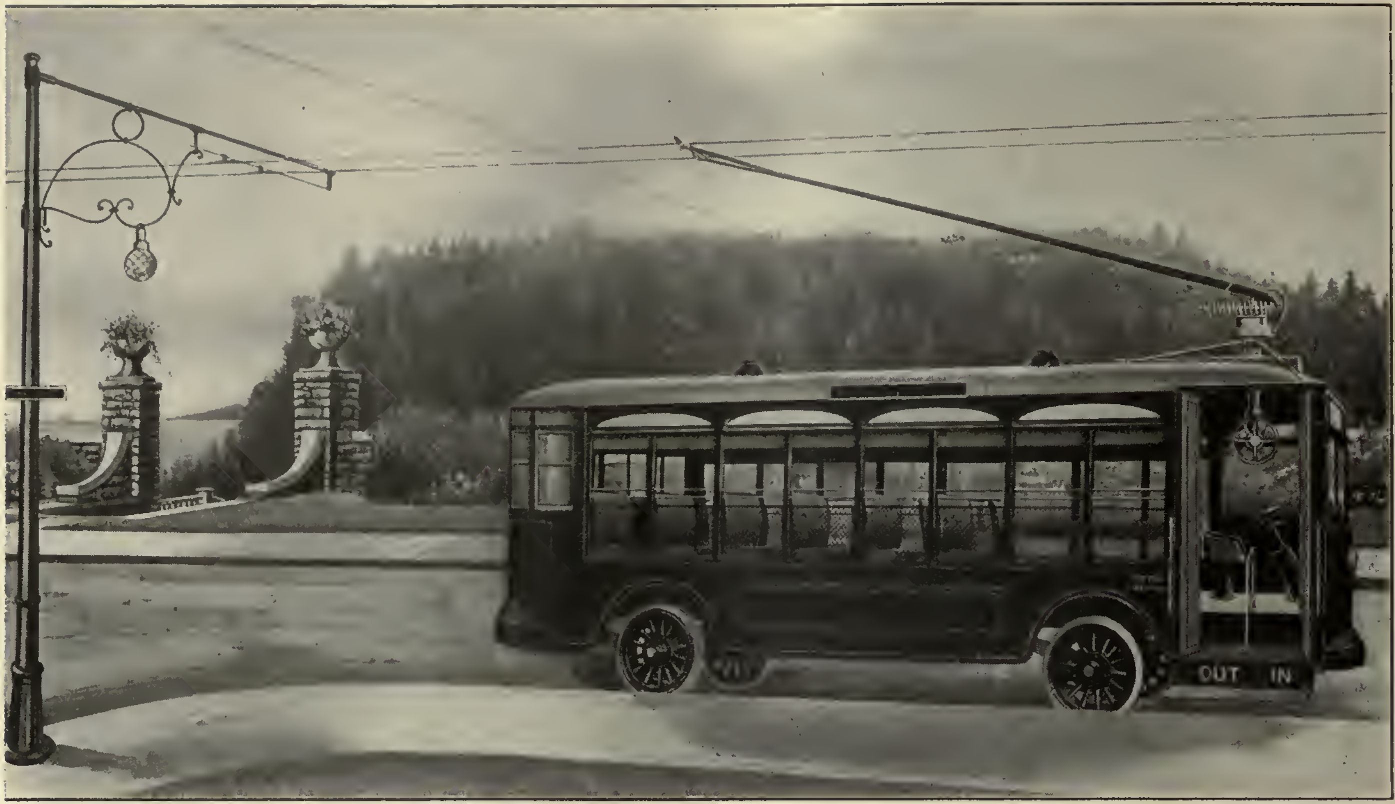
"The extra length of each journal gives the advantage of distributing the pressures over a great area, thus *reducing friction and materially increasing the life of both journals and bearings.* Both sides of each crank pin are protected against end play by extraordinarily wide cheeks.

"The tendency of all crankshafts to wear oval or out of round is obviated by putting the shaft through a process of *case-hardening which imparts a glass hard outer surface, leaving the center strong and tough.*"

INTERNATIONAL MOTOR COMPANY
25 Broadway New York City

Branches owned by this company operate under the titles of: "MACK MOTOR TRUCK COMPANY" and "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION."

PERFORMANCE COUNTS



Seating capacity 35-passengers—Semi-Convertible

The Berg Trackless Trolley

Four-Motor
Four-Wheel Drive
Every wheel a driving wheel

Total operating cost approximately 18 cents per car mile for a 35 passenger Bus.

Current consumption lowest known approximately 1 K.W. per car mile.

Speed 20 to 25 miles per hour with rapid acceleration.

Equipped with four General Electric High Speed ventilated motors, 14 H. P. each, 56 H.P. in all, and G. E. foot or hand operated Master Controller.

Four-wheel drive giving 100% traction and operation through snow or mud; braking on all four wheels, allows rapid stops, prevents skidding.

Distribution of power to the driving wheels as in railway practice.

Our concentric gear unit drive eliminates all differential gearings, universal joints, etc. DRIVING GEARS ARE GUARANTEED FOR TWO YEARS.

Our 35 passenger chassis weighs only 7100 pounds including all electrical equipment.

Our illustrated circulars give full details, including an analysis of actual operating expenses.

Write for full details and quotations.

Trackless Trolley Corporation

501 Fifth Avenue, New York

Built in popular semi-convertible type or standard closed body as specified

Current Collecting Devices

Either single pole sliding contact collector or double pole with trolley wheel collector, using standard line material.

Rear view showing motors attached to wheels

Shop and Power Plant Equipment

Advertisers in this section

Allis-Chalmers Mfg. Co.
American Engineering Co.
Anchor Webbing Co.

Babcock & Wilcox Co.
Beckwith-Chandler Co.
Buckeye Jack Mfg. Co.

Cameron Electrical Mfg. Co.
Columbia Machine Works & Malleable Iron Co.

De Vilbiss Mfg. Co., The
Duff Mfg. Co., The

Edgemoor Iron Co.
Electrical Developm't & Machine Co.

Foamite-Childs Corp.
Ford Chain Block Co.
Fort Pitt Steel Castings Co.

Galena-Signal Oil Co.

Ideal Face Shield Co.
Irvington Varnish & Insulator Co.

Mica Insulator Co.

National Vulcanized Fibre Co.

Oil & Waste Saving Machine Co.

Pittsburgh Elec. Furnace Corp.
Power Specialty Co.

Spray Engineering Co.
Standard Oil Co. (Indiana)

Universal Lubricating Co.

Advantages of *High Speed and Low Cost* Spray-painting

A SPEED averaging 3 to 5 times faster than hand-brushing results from spray-painting electric railway equipment. This average rate of speed is taken from the working records of those companies now so satisfactorily doing a large part of their painting with the DeVilbiss Spray-painting System.

This high speed of spray-painting effects a substantial reduction in labor costs and eliminates shop congestion, and profitably makes possible painting rolling stock at shorter intervals for an improved merchandising of service to the riding public.

In addition to this important advantage of high speed and low cost painting, painting the DeVilbiss way insures a more uniform, better looking, better wearing coating on all classes of work — it insures a quality of coating that surpasses hand-brush standards. The spray completely and evenly coats not only the large and easily accessible surfaces but also those places impossible to reach with the brush but which should be painted.

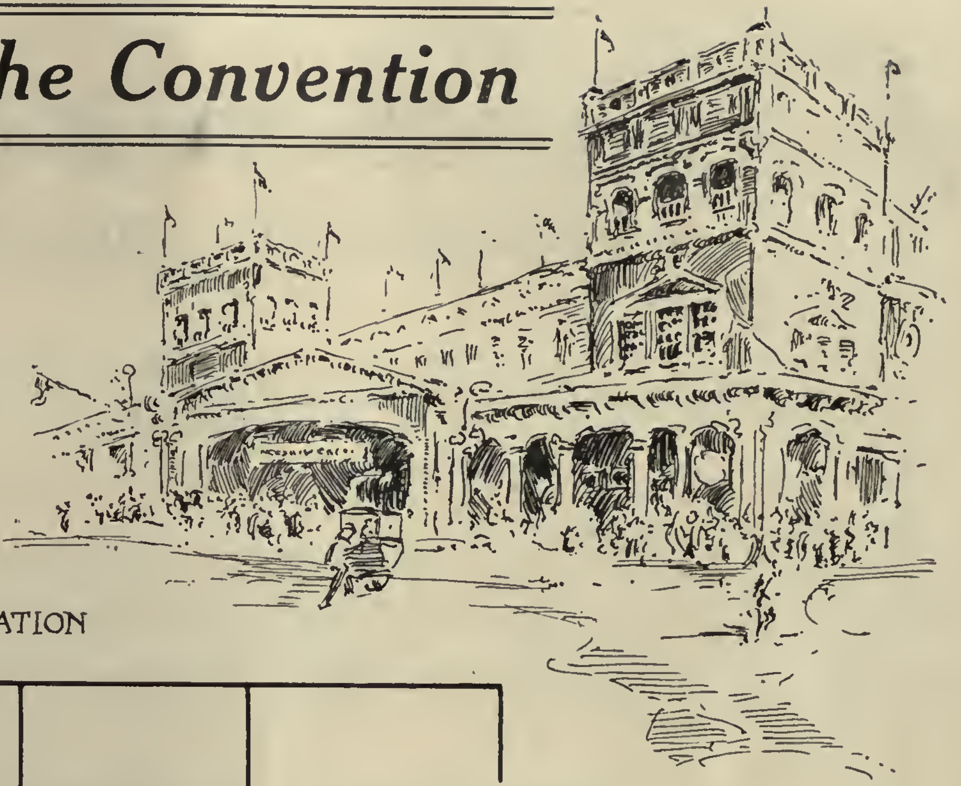
The DeVilbiss spray gun is easy and non-tiring to operate and applies all materials at the lowest practicable air pressure, without drips and spatters.

Consider further the benefits and economies of doing your painting with the DeVilbiss Spray-painting System. We shall promptly mail you additional facts, address—

THE DeVILBISS MFG. CO.
272 Phillips Ave. TOLEDO, OHIO

DeVilbiss
Spray-painting System

Analysing the Convention



MORE PROFITABLE OPERATION

- New Car Designs
- New Equipment
- Improved Motors & Control
- Power House Improvements
- Better Methods
- Better Public Relations

and don't forget PAINT!

For paint is the *immediate* standard by which your service is judged. The "man-in-the-street" does, in the long run, appreciate improved schedules and greater comfort, made possible by modern developments. But he appreciates *instantly* the attractive appearance of cars kept freshly painted inside and out. New paint is an advertisement of proven "pulling" power.

To accomplish in a practical and economical manner the ideal of having cars unusually attractive, demands a discriminating choice of paints and varnishes.

That's where Beckwith-Chandler Products will prove of interest. For not only does their quality ensure a perfect finish, but their tough durability and adaptability keep costs at rock-bottom for a given standard of car-appearance. Simply because they have been developed, through years of experience in paint manufacturing, *especially* to meet transportation needs.

Quotations and other information on request.

The Beckwith-Chandler Company
193-211 Emmett St., Newark, N. J.
320 Fifth Ave., New York

BECKWITH - CHANDLER
Highest Grade Paints & Varnishes

The Highest Development of Vulcanized Cotton Fibre

It has taken nearly a half a century to produce Vul-Cot Fibre—a half century of study and experiment to produce material of exceeding toughness and hardness and that is not brittle.

Vul-Cot is made by the oldest and largest manufacturer of Vulcanized Fibre in the country. Every detail, every process in the manufacturing of Vul-Cot Fibre is performed in the three huge plants of the National Vulcanized Fibre Company.

The result is a Fibre that is three times as tough as leather. No ordinary force can crush, break, crack or split it. Its tensil strength is from 9,000 to 14,000 pounds per square inch, with a resistance to shearing up to 13,000 pounds per square inch, and an electrical rupture up to 400 volts per Mil.

We have made Vul-Cot Fibre with such care, with such minute attention to every detail that we can guarantee it to be free from impurities.

If there is a place for fibre in the composition of your product—if there is a possibility for a material that is as hard as horn, as durable as steel, as adaptable as rubber and yet less costly than any—we will gladly place at your disposal the experience gained through years of making parts for the products of the host of manufacturers who use Vul-Cot Fibre.

NATIONAL VULCANIZED FIBRE COMPANY
Wilmington, Delaware

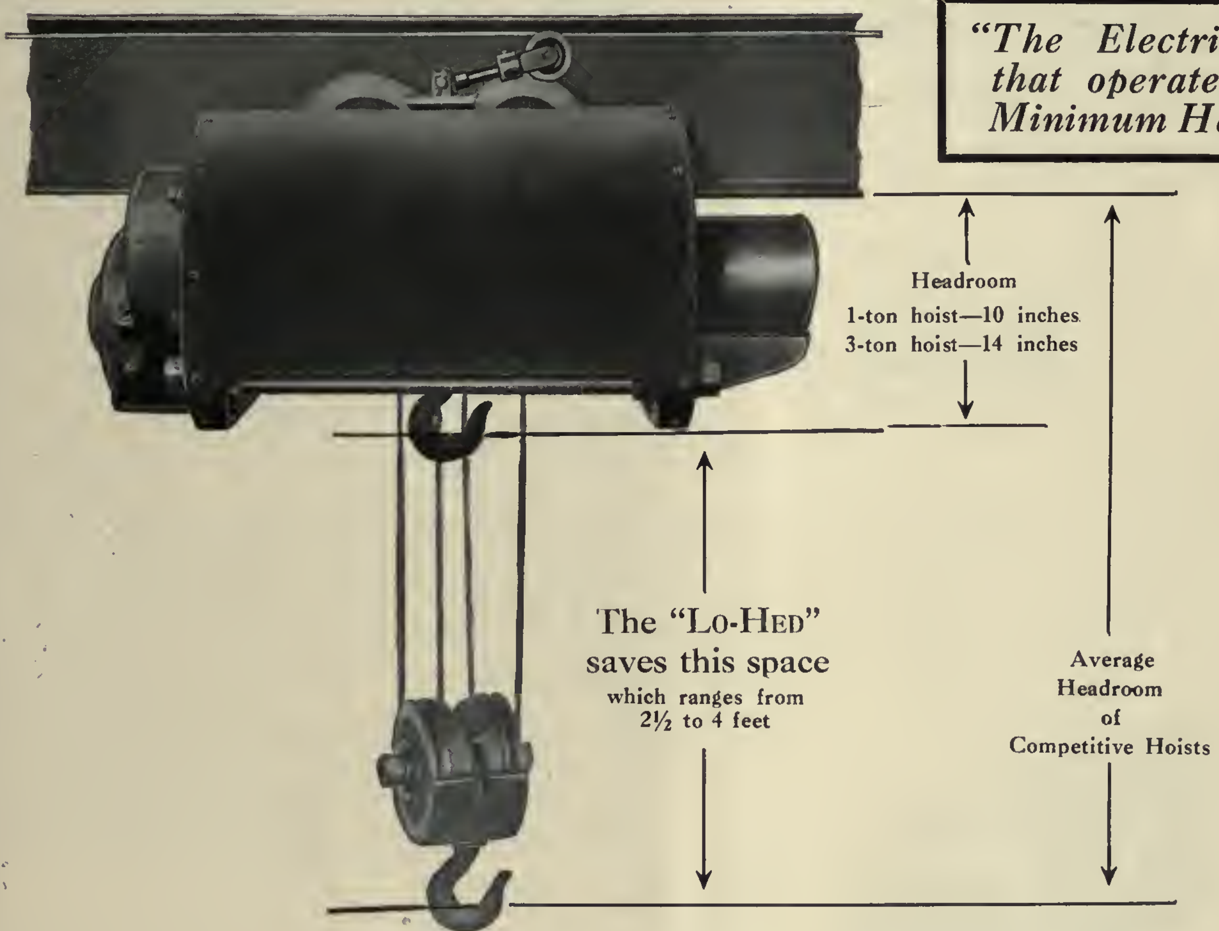
LO-HED

PATENTED

Mono-Rail Electric Hoist

Built in capacities of **1000** *to* **12,000** *lb.*

"The Electric Hoist that operates in the Minimum Headroom"



Headroom
1-ton hoist—10 inches
3-ton hoist—14 inches
The "LO-HED" saves this space
which ranges from 2½ to 4 feet
Average Headroom of Competitive Hoists

Types:
- Without Trolley, Floor Operated
- Plain Trolley, Floor Operated
- Hand Geared, Floor Operated
- Motor Driven, Floor Operated
- Motor Driven, Cage Operated

A. C. or D. C.

Operates on Standard I-Beams Around Curves and Through Switches

The Ideal Hoist for the Shop!

The "Lo-Hed" Hoist in your shops will open up thousands of additional cubic feet of space for lifting, handling and stacking materials.

Simple—Rugged—Safe

Write for the new Catalog just off the press—It is convincing.

American Engineering Company

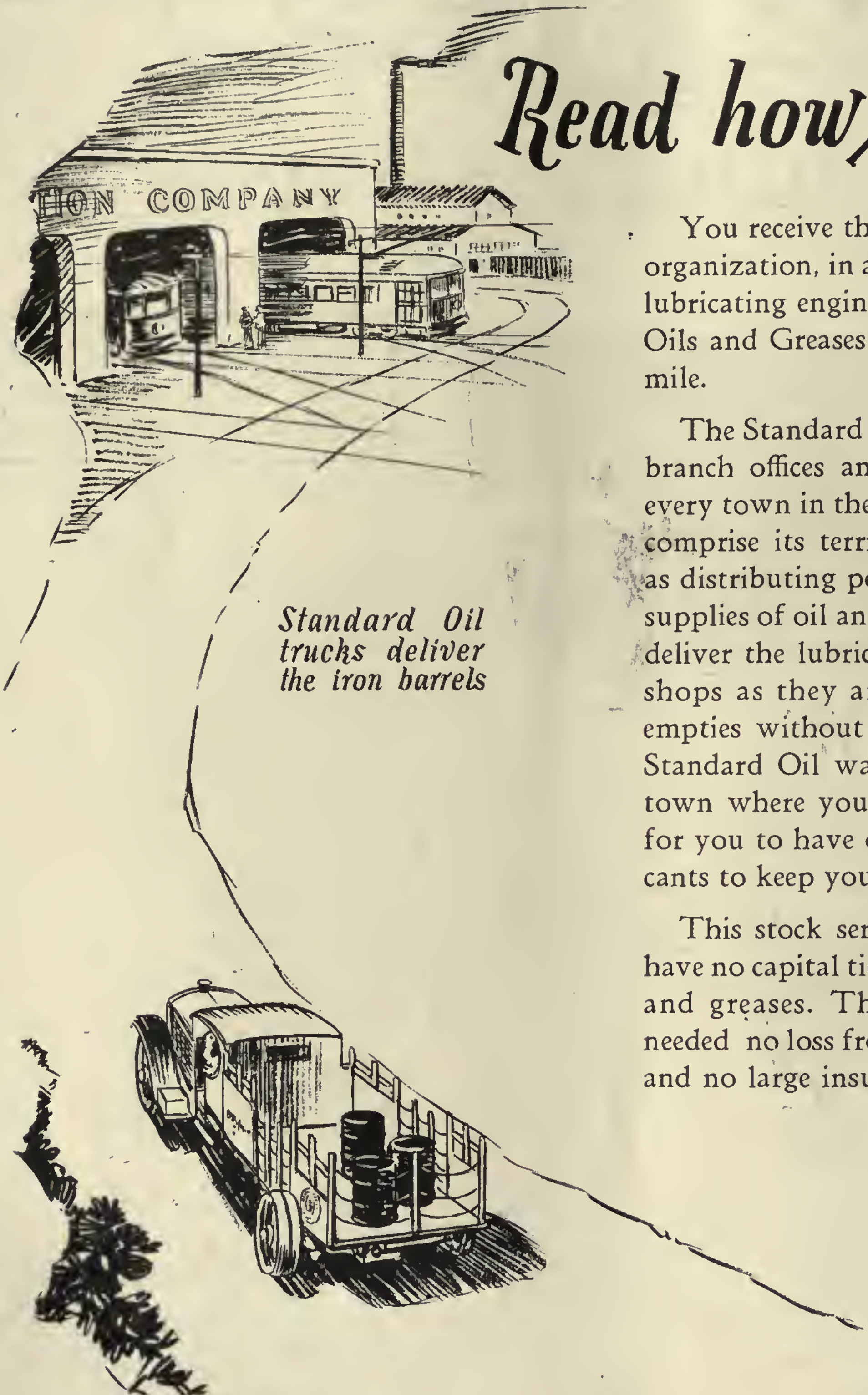
2414 Aramingo Ave., Philadelphia, Pa.

REPRESENTATIVES:

Hunter L. Betts, 406 Franklin St., Syracuse, N. Y.
H. D. Conkey, 606 Chamber of Commerce, Chicago, Ill.
Coon-de-Visser, 1772 W. Lafayette Boulevard, Detroit, Mich.
Dravo-Doyle, Diamond Bank Building, Pittsburgh, Pa.
Dreyer Sales & Engineering Co., Union Building, Cleveland, O.
A. Q. Dufour, Merchants & Miners Bank Building, Milwaukee, Wis.
Florandin Equipment Co., 110 West 40th St., New York City.
Menner & Kimball, Syndicate Trust Building, St. Louis, Mo.
J. G. Robertson, 2528 University Ave., St. Paul, Minn.
Lyman Tube & Supply Co., Montreal, Quebec, Canada.

Standard Service

Read how,



Standard Oil trucks deliver the iron barrels

You receive the services of our distributing organization, in addition to the services of our lubricating engineers, when you use Standard Oils and Greases to reduce your costs per car mile.

The Standard Oil Company (Indiana) has branch offices and warehouses in practically every town in the ten midwestern states which comprise its territory. These warehouses act as distributing points for you and carry your supplies of oil and grease in stock. Our trucks deliver the lubricants in iron barrels to your shops as they are needed, and pick up the empties without extra charge. As there is a Standard Oil warehouse in practically every town where you have a shop, it is necessary for you to have on hand, only enough lubricants to keep you going from week to week.

This stock service saves you money. You have no capital tied up in a large supply of oils and greases. There is no special oil room needed no loss from oil leakage, no fire hazard and no large insurance charges to meet. And

Standard Oils

The Right Oil

Saves You Money

it is not necessary for you to pay hauling charges on oil barrels to and from freight depots.

Other traction companies are profiting by this service. One large Missouri company saved on an average of $60.00 per month in hauling and labor charges incidental to the getting of oil barrels to and from freight depots. Another company in Michigan writes us that their saving on handling and storage for oils and greases was $600.00 during the past year. This was a substantial saving when considered against their total oil purchases.

There are other factors when you use Standard lubricants which will help reduce your costs. What they are, can best be told by one of our lubricating engineers, who will be glad to talk them over, without obligation to you. Will you let us know when to send him, please?

STANDARD OIL COMPANY
(INDIANA)
910 S. Michigan Avenue CHICAGO, ILL.

TRACTION COM
Standard Oil trucks pick up the empties

and Greases
for the Right Place

Eight More Edge Moor

Right: Eight 1306 H. P. Edge Moor Boilers now operating in Lakeside plant. Below: an interesting view of the largest power plant in the world using pulverized fuel exclusively.

EDGE MOOR

FOR INCREASED

Boilers for Lakeside

1765 H. P. Units—Makes Total of 16 Edge Moor Boilers for Lakeside—24,568 H. P.—High Efficiencies Shown in Official Tests

EIGHT additional Edge Moor Boilers of 1765 H. P. each are under construction for the Lakeside plant of the Milwaukee Electric Railway & Light Company. These are being built for 315 lbs. working pressure, and will be equipped with Foster superheaters and economizers. They will furnish steam for the second unit of the plant, which will consist of two 30,000 KW turbines.

The Lakeside station is the largest power plant in the world using pulverized fuel exclusively. Eight 1306 H. P. Edge Moor Boilers constitute the present boiler equipment. They are normally operated at 200% of their rated capacity. Official tests have shown remarkably high efficiencies obtained.

The latest series of twenty-six tests, conducted by the Fuel Section of the U. S. Bureau of Mines, showed a mean thermal efficiency of boiler and superheater of about 84%, based on the gross calorific value of the fuel. The rate of steaming had but little effect on the efficiency obtained.

This latest order brings the total number of Edge Moor Boilers purchased by the Milwaukee Electric Railway & Light Company to more than 60,000 H. P.

The Edge Moor catalogue describes the features of this boiler that have won it preference in large and small plants. Where shall we send your copy?

EDGE MOOR IRON COMPANY
Established 1868
EDGE MOOR, DELAWARE
New York Chicago St. Paul Boston Pittsburgh Charlotte

Water Tube BOILERS

FUEL ECONOMY

Harness Electr

IRVINGTON PRODUCTS

Made to your individual needs

Black and Yellow Tape
Seamless Bias, Sewed Bias and Straight Cut

Black and Yellow Varnished Cambric

Varnished Silk Varnished Paper

Flexible Varnished Tubing

Insulating Varnishes

Enameled Wire

"IRV-O-SLOT" ARMATURE INSULATION

ower with Irvington Insulation

INSULATION might well be called the "harness" of electric power—keeping heavy currents in check, directing their flow through cables and coils.

Irvington Insulation Products have proved safer and more efficient because of their absolute uniformity.

Irvington Service has reduced shopping time to a minimum by supplying materials manufactured to the customer's individual requirements. A keen appreciation of electric railway needs has resulted in the development of insulation particularly adapted to this class of service—**Irvington Seamless Bias Tape; Black and Yellow Varnished Cambric; "Irv-O-Slot" Armature Insulation.**

Each of these Irvington Products has been accepted as standard electric railway practice in point of low installation cost; long life; and high dielectric efficiency.

Consult us for full details.

IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.
Established 1905

Sales Representatives:

Mitchell-Rand Mfg. Co., New York
T. C. White Electric Supply Co., St. Louis
E. M. Wolcott, Rochester
L. L. Fleig & Co., Chicago
Consumers Rubber Co., Cleveland
Clapp & Lamoree, Los Angeles
F. G. Scofield, Toronto

GALENA
-OILS-

If—

The proof of an oil is on the maintenance sheet

Galena Electric Car Oil
Galena Power House Valve Oil
Galena Power House Engine Oil
Galena Air Compressor Oils
Galena Turbine and Dynamo Oils
Galena Perfection Compound
Galena Lubricating Greases

A time-tried and service-tested Galena Oil or Grease for every motion or bearing part in electric railway service.

QUALITY-SERVICE-ECONOMY
G O S C
GALENA OILS

GALENA-SIGNA

New York

Frankli

and offices in

—oils were bartered

OUT in the African Bush a Basuto Chief is purchasing cattle. He pays, not in currency as we do, but in merchandise—in corn, in native cloth, maybe in raw gold.

But how is the relative value of this merchandise arrived at, since there is no fixed standard of comparison? Simply by the measure of useful service which it can render.

We in our commercial dealings, might well apply the same principle, judging of commodities, not by their price alone, but with full consideration of their capacity for service.

Lubricants, for instance. Naturally, Galena Railway Oils — manufactured by special process from the highest grade stocks made—cost more than those produced from the lower grade crudes, with less painstaking thoroughness and expert knowledge. But when you come to compare the service value of Galena Oils with that of the cheaper grades—when you figure in repair costs; mileage; and maintenance, then their true economy becomes very evident. If oils were bartered Galena Oils would undoubtedly rank first in esteem.

Put your lubrication up to Galena Service Engineers and be assured of maximum operating efficiency.

)IL COMPANY

a. **Chicago**

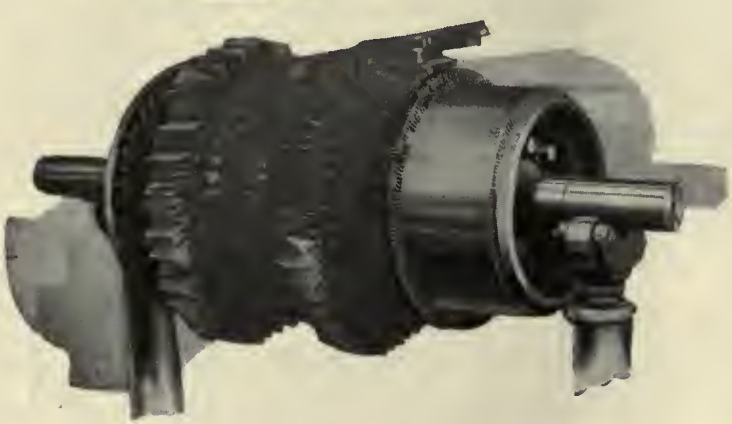
rincipal cities

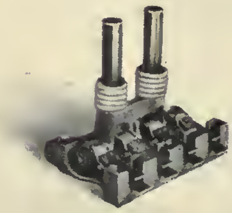
QUALITY · SERVICE · ECONOMY · GALENA OILS · G O S

COLUMBIA~A SERVICE OF CO

Motor

COLUMBIA
18 92
MACHINE WORKS





ERVATION AND CONSTRUCTION

and Truck Parts

In stock or built to your specifications

We want electric railway operators to feel that Columbia Service is practically a branch of their own organizations. We want them to use the Columbia Shops as they would use their own shops, being assured always of prompt attention, all the skill that an up-to-date plant, and staff of carefully trained experts can guarantee.

We hold complete stock of standard motor and truck parts, and Columbia Specialties, ready for immediate shipment in emergency.

Work of any size which is not standard can be handled in the shortest time that modern methods and long experience have made possible.

Columbia

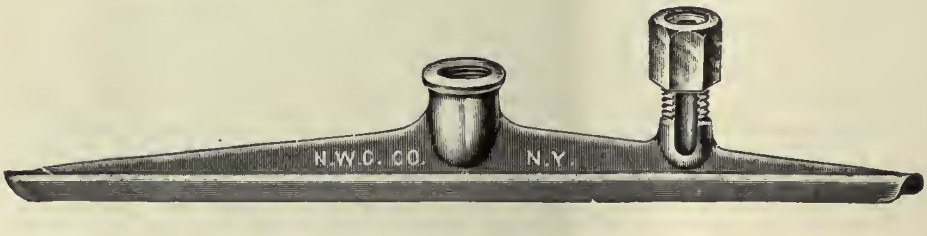
Commutators (all sizes in types)
Armature and Field Coils
Brush Holders
Armature, Axle and Journal Bearings
Gear Cases (Steel and Malleable Iron)
Resistance grids
Control Fingers and Burning Segment Tips
Terminals of all types

The Columbia Machine Works
and Malleable Iron Company
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

COLUMBIA ~ A SERVICE OF CO

Trolley

COLUMBIA 1892 MACHINE WORKS



ERVATION AND CONSTRUCTION

nd Line Equipment

A complete standard stock—plus Columbia resources

Sound practical designs built-up of material of "just right" composition, those are sound reasons for the increasing popularity of Columbia Standard Trolley and Line Materials. Our long experience in the design and manufacture of special equipment has enabled us to sift the best from many standards of practice.

The new brass and bronze foundry, completely equipped, can handle "special" jobs quickly. Many hundreds of patterns already on hand make substantial savings possible in the majority of cases. Our long experience in compounding suitable alloys may help in the solution of your problems.

Trolley Poles, Wheels and Harps
Clinch Line Ears
Anchor Ears
Splicing Ears (to specifications)
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Line Anchors
Line Frogs and Crossings, etc.

The Columbia Machine Works
and Malleable Iron Company
Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

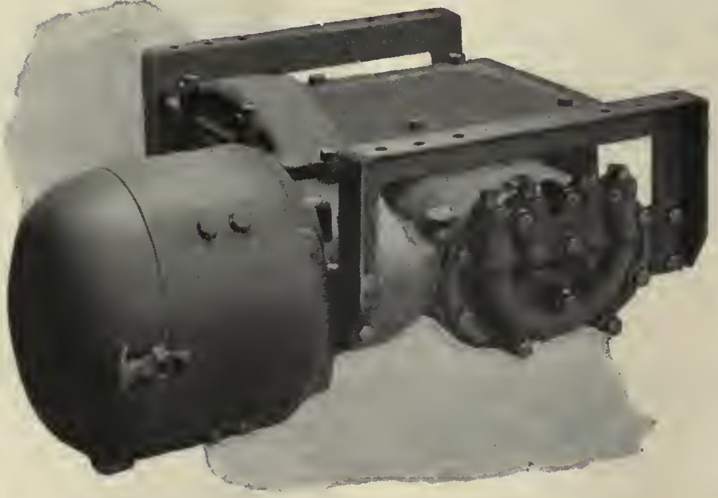
Dependable Air Brake Equipment for Electric Railways

Type OB4
Governor

The culmination of over 20 years of experience.

Type C
Engineers Valve

½-inch
Pop Safety Valve

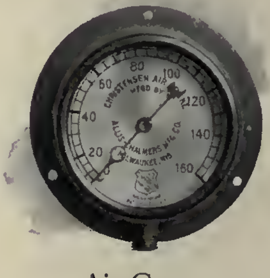

Type AA-7B—17 Cu. Ft.
Air Compressor

Drain and
Stop Cock

Type J
Emergency Valve

Send in your specifications

**See this equipment at
American Electric Railway Association
Convention, Section B, Booth 71**



Air Gauge

ALLIS-CHALMERS PRODUCTS
Electrical Machinery
Steam Turbines
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MILWAUKEE, WISCONSIN, U.S.A.

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Let "FRANKLIN" Help—

to make your next Power Plant a super-safe installation; for continuity of service pays real dividends.

The "FRANKLIN" Line includes:

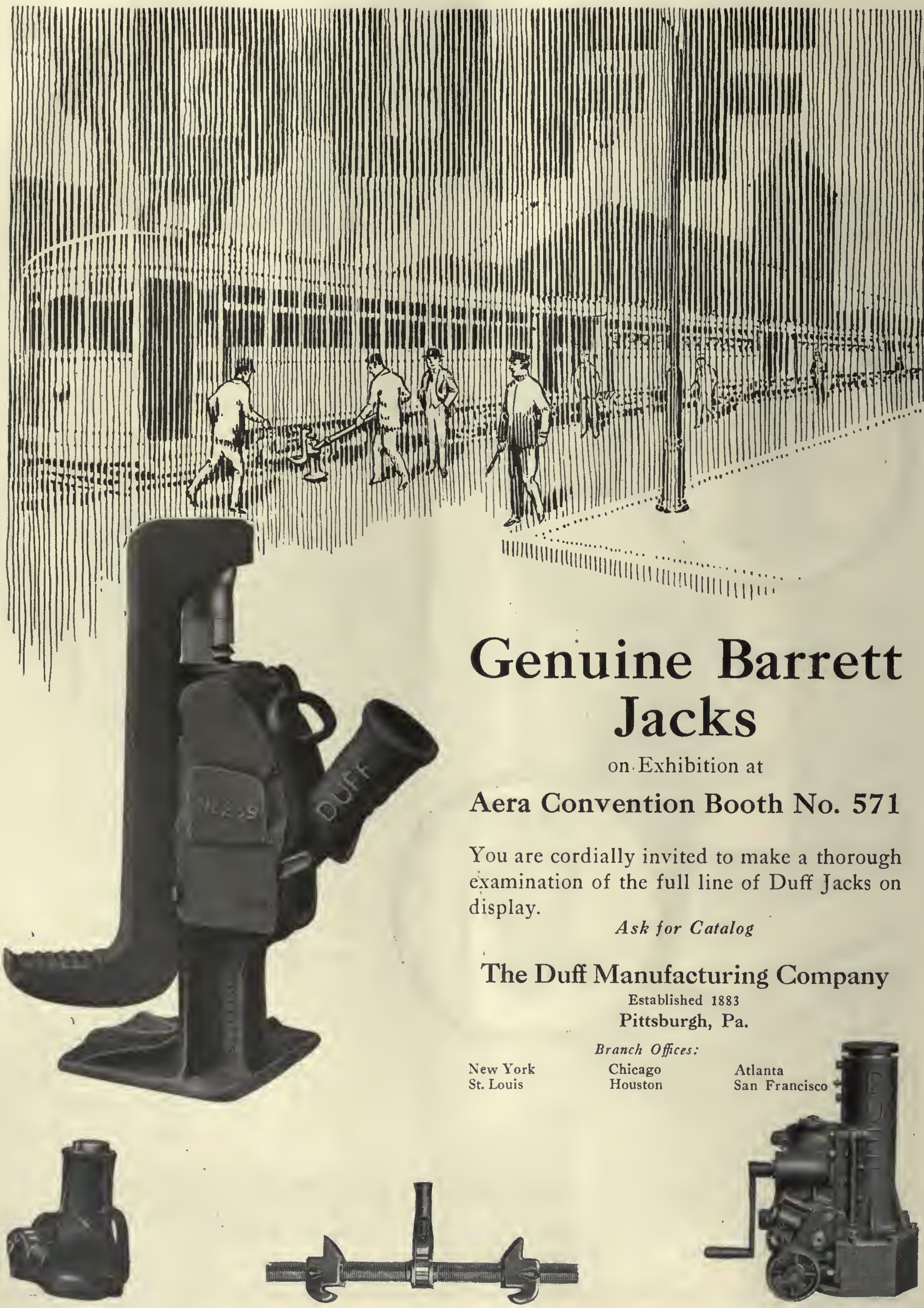
- **Disconnecting Switches**
- **Bus Bar Insulators**
- **Cable Potheads**
- **Cleat Type Insulators**
- **Instrument Cut Out Switches**
- **Compartment Doors**
- **Air Pressure Relays**

Quality of materials, together with the best of workmanship and years of experience in design, are responsible for the unusual service given by the whole "FRANKLIN" line.

After years of satisfactory service in power stations thruout the country we can say "It pays to install the 'FRANKLIN'". The truth of the slogan, "Install the 'FRANKLIN' and forget it" has been proven conclusively.

ELECTRICAL DEVELOPMENT
& MACHINE COMPANY
Philadelphia

Representatives in All Principal Cities



Genuine Barrett Jacks

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You are cordially invited to make a thorough examination of the full line of Duff Jacks on display.

Ask for Catalog

The Duff Manufacturing Company
Established 1883
Pittsburgh, Pa.

Branch Offices:
New York
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Chicago
Houston
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Before this happens—

Underwood & Underwood

Why not let a *fire-protection engineer* make sure that all your fire hazards are fully covered?

THE biggest gamble in modern industry is *inadequate installation of fire-protective measures.* And records show that the electrical industry has been a heavy loser.

Live equipment in itself is a fire risk that demands expert analysis for proper protection. Not merely a few extinguishers hung where it's convenient to hang them, but the right extinguisher in the right place—maintained at constant efficiency.

And electricity is only *one* risk. Most plants have the additional menace of oil, paint, gasoline, grease, and other "highly inflammables," *plus* ordinary hazards—wood, cotton waste, miscellaneous refuse. *Fire acts differently on each group.* Different extinguishing agents are required. You must have *correct installation of the right method or methods.*

Here is a scientific service that holds fire losses to an absolute minimum

By calling in a Foamite-Childs fire protection engineer, you can have positive assurance that fire will never catch you unprepared.

Among Foamite-Childs men are highly-trained, graduate engineers whose practical experience covers the whole field of controlling fire scientifically. They know all the means and all the methods, and can apply each where it properly belongs. They find out what kind of protection will best safeguard your property, and recommend nothing else.

Behind them is the Foamite-Childs Corporation, manufacturing all types of chemical fire-extinguishing devices. No danger of getting the wrong thing; no delay in getting the *right* thing.

TO STIFLE ELECTRICAL COMBUSTION the *Fire-Gun* is supremely effective. It hand-pumps a non-conducting, continuous stream straight to the base of trouble. Mechanically perfect; easy to operate. Standard equipment of many leading railroads and public utilities.

WHERE THERE'S OIL, GASOLINE, PAINT, VARNISH, TAR, RESIN, CHEMICALS *Foamite* Protection has proved indispensable. The Firefoam that *Foamite* equipment generates will smother the fiercest blaze under a blanket of carbon-dioxide gas bubbles. *Foamite* Protection is available in portable extinguishers, engines, and large stationary systems.

AND WHERE IT'S VERY COLD you can have real fire protection with the *Allweather*, a non-freezing extinguisher that functions perfectly down to 40° below zero.

WHILE FOR ORDINARY RISKS *Childs* Soda-and-acid extinguishers and engines have been standard for 27 years.

In a word, the Foamite-Childs Corporation offers *complete protection against fire risks of every description.* Through our many division offices located at convenient centers, we are equipped to prescribe, install and maintain the fire-protective system precisely suited to each particular risk.

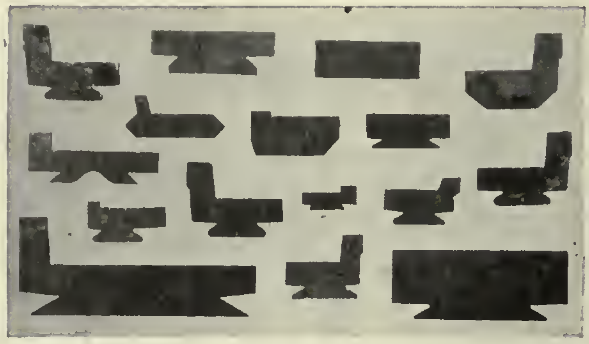
Our engineers will make recommendations and furnish rough estimates that place you under no obligation.

Foamite-Childs Corporation

Fire Protection Engineers and Manufacturers
122 Turner Street, Utica, N. Y.

Sales and Engineering Representatives in the leading cities of all countries

Real Railway Insulation



Micanite Commutator Segments

Produced form Micanite Plate containing 95 per cent selected mica film, having all the advantages of pure mica, yet in readily applied form. Provides real insulation for railway motor commutators regardless of heat, moisture or fumes. Supplied in plate form to specified thickness or to exact dimensions ready for use.

Micanite Moulded Parts

Almost thirty years' service in the electrical industry is the best guarantee of this product's usefulness to the railway maintenance engineer. Made from special Micanite Moulding Plate for all sizes of commutator rings, tubes, sleeves, cones and bushings.

Empire Insulating Cloth

Fabric base coated with films of oxidized oil, providing a flexible yet firm, tough insulation. Oil and moisture proof, and extremely long in life. Has many valuable uses in car equipment repair work.

Micanite Flexible Tape

Finest India mica films, paper faced both sides. Supreme for high temperature insulation on strap- and bar-wound railway motor armatures and similar heavy duty service. Kept fresh in air-tight cans.

Armatite—2 Insulations In 1

By combining the insulating and protective properties of Empire Cloth and fish paper in a single new product, "Armatite," the amount of time required to line and insulate armature slots and other parts is reduced one-half. The two elements, cemented under pressure, provide a flexible, easily handled, permanent, dual protection. Two insulations in one.

Gladly sent on request to any interested Railway Man: Bulletin 85, "Electrical Insulating Materials," and Bulletin 79, "Insulation for Railway Motors"

PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF.

MICA INSULATOR CO.

PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

Main Office: 68 Church Street, New York.
Works: Schenectady, New York.

Chicago Office: 542 South Dearborn Street.
Representatives in all the principal cities.

2010-F

BUCKEYE Jacks to meet every railway requirement

We make jacks suited to every railroad requirement. Our No. 1 Trip-Track Jack is of special use in track work—positive, speedy and ruggedly durable. For difficult car and track operations, where ordinary jacks cannot be used, the Special Emergency Jack No. 239 will save the situation by reason of its almost universal adjustability. By means of the adjustable step on the overhanging claw foot the original raise of the rack will be retained, a special important feature with *Buckeye* Emergency Jacks.

The Buckeye Jack Mfg. Co.
Alliance, Ohio

Why Send a Boy On a Man's Errand—

When breakage occurs why replace the broken casting with a new one of the same class material?

This is false economy and affords but temporary relief.

Electric Steel Castings not only minimize the possibility of breakage, but considerably reduce maintenance costs on account of their long-life, resistance to wear and ability to withstand shocks that invariably break castings of inferior metals.

For seventeen years we have co-operated with various street railways in reducing maintenance costs.

Why not let our Service Engineer discuss with your Master Mechanic the work which we are doing to eliminate trouble of this kind.

MEMBER ELECTRIC STEEL FOUNDERS RESEARCH GROUP

SMALL INTRICATE

Fort Pitt Steel Casting Co.
ELECTRIC STEEL CASTINGS
McKeesport, Pa.

THIN SECTION

FORT PITT

MINIMIZE MAINTENANCE Cost with Cameron Products

Cameron Coils—Wound to withstand that rush-hour overload that means a burnout with poorly insulated coils.

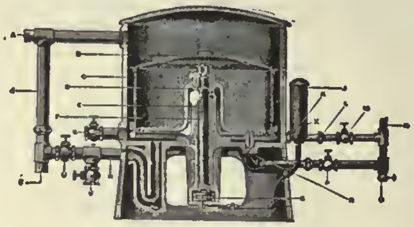
Cameron Bars—Pure hard drawn copper, giving high conductivity.

Cameron Commutators—Made tight by hydraulic pressure, eliminating loose bars and arcing brushes.

Canadian Amber—Gives soft, uniform wear and long life.

Cameron Electrical Mfg. Co., Inc.
Ansonia, Connecticut

There are dollar bills in your oily waste Pile —*Get them out!*



Quite an appreciable percentage of costly lubricants finds its way into the oily waste pile, but there's no reason why it should stay there. This simple, efficient machine is reclaiming hundreds of gallons of lubricant and many pounds of waste for large electric railway companies throughout the country. A sound economy that means no loss of lubricating efficiency.

Get full details right away.

Oil & Waste Saving Machine Co.
Philadelphia, Pa.

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio

Advertisements for the
Searchlight Section

Can be received at the New York Office of Electric Railway Journal until 10 a. m.

Wednesday

For issue out Saturday

0220

Save 50-80% Labor Costs The "SPRACO" Way

One handy man with "Spraco" Paint Gun easily outstrips 4 or 5 brush painters. On Car Bodies—Under Rigging—Bridges—Elevated Structures—Steel Frame Buildings—Tubular Poles, etc. In fact every class of painting and finishing work.

Get a "SPRACO" Paint Gun—Compare Results
Send *Today* for "Spraco" Bulletin P-71

SPRACO PRODUCTS

SPRAY
Engineering Co.
60 High St.
Boston, Mass.

SPRACO PRODUCTS

The Ideal Face Shield

Cuts Welding Costs

because it enables the operator to make better welds faster. The window opens, enabling him to inspect the work frequently without removing the helmet. This feature also affords instant relief from heat or lack of air.

The Ideal Face Shield is light but durable, made of aluminum and vulcanized fibre. Keeps the operator more comfortable and helps him speed up his work. Glass can be removed for cleaning without tools.

Price $9.00—write today

The Ideal Face Shield Company
468 N. Garfield Avenue, Columbus, Ohio

FORD
Tribloc Chain Hoists

FORD TRIBLOC
PAT.09.
Look for The Green Loop Guide

THE *Green* Loop Guide is the mark of a good chain hoist. Good because of the high efficiency of its planetary gearing; because of its Patented Loop Hand Chain Guide which protects the hoist and controls the hand chain at all speeds of travel; because of its rugged construction throughout.

Ford Triblocs have 80% efficiency; an eighty-two pound pull of one man on the hand chain of a 1-Ton Tribloc will lift a ton. Strong and compact. Made entirely of malleable iron and steel, except the Hand Chain Wheel, which is gray iron. Capacities from ¼ to 20 tons.

Write for Catalog 5-B

FORD CHAIN BLOCK COMPANY
2nd & Diamond Sts., Philadelphia, Pa.
Overseas Representative: Allied Machinery Co. of America
51 Chambers St., New York, N. Y.

A stitch in time saves nine—

AWEBCO
ELECTRICAL
TAPES
and WEBBINGS

If It's a *GOOD* Stitch

If it isn't—well, it's just as likely to be the cause of nine more!

Motor repairs and replacements made wieh Awebco Electrical Tapes and Webbings are in the nature of good stitches—*they stay put.*

That's because Awebco products are uniformly woven from high-grade raw materials. Their insulation value is a fixed factor, and each tape or webbing has been produced with an expert knowledge of the uses for which it will be required.

Anchor Webbing Company
300 Brook Street, Pawtucket, R. I.

Sample cards and full details on request.

Awebco
TRADE MARK

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, North American Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
TUCSON, ARIZ., 21 So. Stone Avenue
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WORKS
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Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

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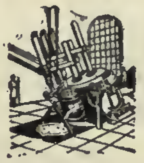
FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK

Boston Philadelphia Pittsburgh Kansas City Dallas Chicago San Francisco London, Eng.

MOORE RAPID 'LECTROMELT FURNACES



MAKE YOUR OWN STEEL AND IRON CASTINGS
WHEN AND AS YOU NEED THEM

PITTSBURGH ELECTRIC FURNACE
CORPORATION

Largest Maker of Arc Furnaces in the World

PITTSBURGH, PA.

The Most Successful Men in the Electric Railway Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week

Car and Truck Equipmen

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Stackpole
Carbon
Brushes

Increase
Your
Profits

Why not form your own opinion?

We might talk for hours on the many superior quality points embodied in Stackpole Carbon Brushes. Yet our arguments could never be so convincing as actual performance records on your own motors and converters.

Why not give Stackpole Brushes a trial? Put them in the hardest service you can find! And compare final costs!

You will then know what we mean, when we say that the ultimate in brushes for economical, uninterrupted commutation are made right here in America.

S C Co

Grade L-30

For traction motors (both ventilated and enclosed types)

Grades S-932 and S-933

For rotary converter slip rings of all sizes and speeds. Also for induction motors.

The
STACKPOLE CARBON COMPANY
ST. MARY'S PENNA.

The Air Rectifier Eliminates Frozen Air

Hundreds of Cars now equipped with Air Rectifiers. Free yours from the perennial trouble due to frozen air. It will pay to investigate and order trial sets for the coming winter.

An Air Rectifier is a simple, inexpensive device, easily installed. It has no moving parts, operates automatically, and fully protects car air equipment against "frozen air." When the atmospheric temperature approaches the freezing point such troubles develop. The expansion of air into the cold piping condenses out the moisture which freezes, thus building up a honeycomb formation in the pipes and finally rendering the brake system inoperative.

An Air Rectifier, without in any way obstructing the air passage, automatically mixes alcohol and its vapor with the water and air. This lowers the freezing point and enables the normal flow of air to expel the water from the system.

An Air Rectifier holds three pints of alcohol—an amount sufficient for ordinary service for 90 days operation. Moreover it will improve braking service by cutting the grease, oil and gum, thereby freeing or easing up the valves.

It serves equally well to prevent "frozen air" troubles on air-operated auxiliary equipment such as door engines, etc.

Send for Complete Description and Prices

Economy Electric Devices Company

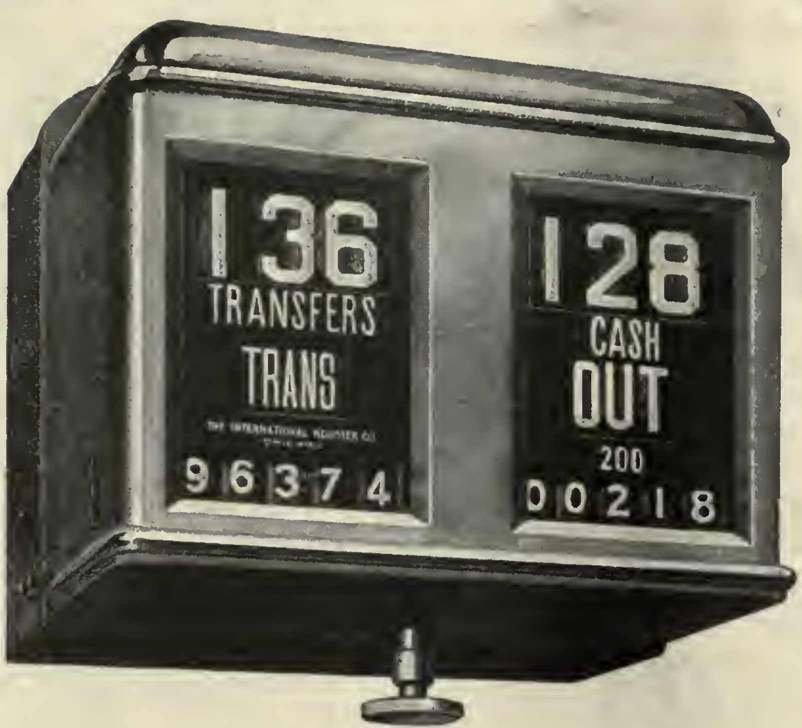
L. E. Gould, *President*

Sangamo Economy Railway Meters (*General Sales Agents*) Lind Aluminum Field Coils

District Agents for

Peter Smith Heaters
Woods Fare Boxes
Bemis Boyerized Truck Specialties
Miller Trolley Shoes

1592 Old Colony Building, Chicago

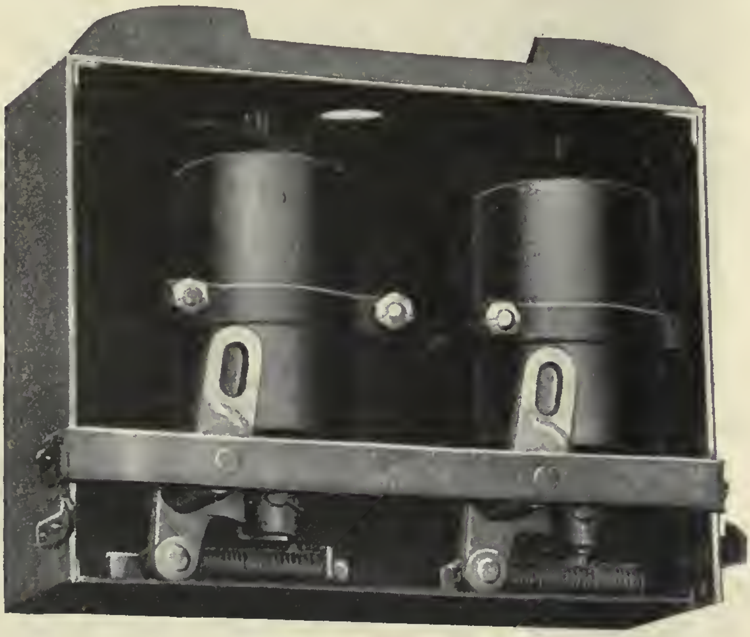


R11 Electrically Operated Register

A Distinct Advance in Fare Registration

The 200 new cars now being placed in service on the lines of the Brooklyn City Railroad, have installed a distinctly new and very efficient type of fare collection and registration. This consists of an International Type R11 double electrically operated fare and transfer register as illustrated above, mounted on the inside of a bulkhead where the registration is plainly visible to passengers and with bells that are audible throughout the car.

The fare registration mechansim is operated electrically from a specially designed Johnson fare receiving and coin switch box. The dropping of coins in this box is all that is necessary to ring and register the unit cash fares on the Type R11 register. The box is designed to receive nickels and dimes, registering one fare for a nickel and two fares for a dime.



Electric Back for Operating the R-11 Double Register

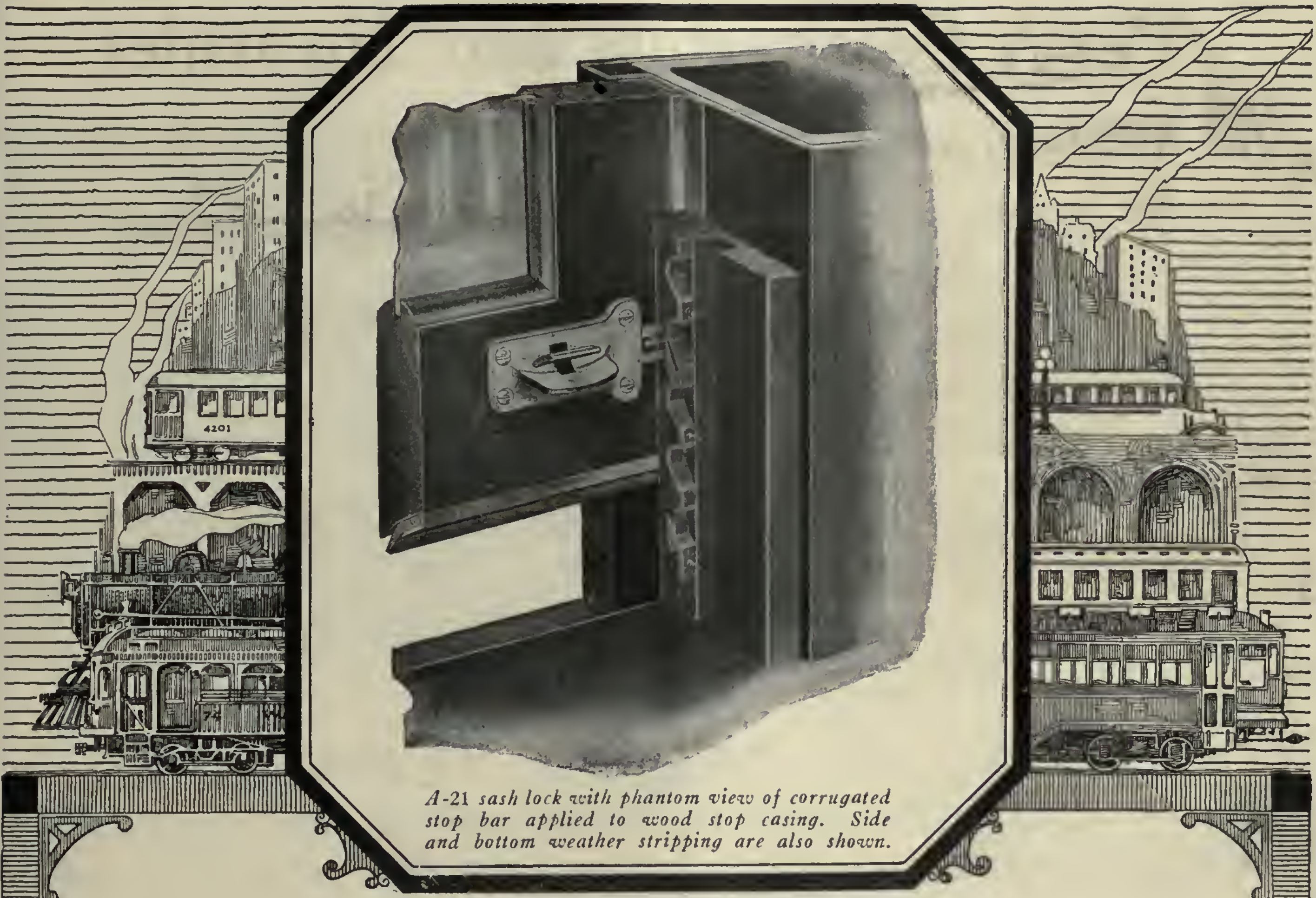
This box has an inspection plate permitting the conductor to plainly see what the passenger deposited and the coins, as in the money counting fare boxes, becomes accessible to the conductor as soon as registered. The transfer registering mechansim is operated from a push button switch mounted on the panel of the conductor's control stand.

The electric back of the register is equipped with two solenoids; one for the operation of the cash fare register and the other for the operation of the transfer register. Both solenoids are wound for operation on 350-550 volts D.C. The register operating circuit is not broken in the register back.

The solenoid operating the cash fare register is connected in series through the coin switch in the Johnson box where adequate facilities are provided for rapid and safe breaking of the register circuit. This feature of having only one switch in the register operating circuit and that one located in the receiving box, is distinctly new. This particular device is adapted for use where there is a straight five cent or straight ten cent fare or where all fares are paid by the use of a token of some uniform size.

This latest device as well as a full line of International single and double registers, hand and foot, electrically and mechanically operated will be shown at our exhibit at the American Electric Railway Association Convention at Atlantic City in spaces 537 and 539. We shall also exhibit the International Cutawl, a device especially adapted for many special uses as well as the full line of Heeren Enamel Coat and Cap Badges.

International Register Co., 15 South Throop St., Chicago, Ill.



A-21 sash lock with phantom view of corrugated stop bar applied to wood stop casing. Side and bottom weather stripping are also shown.

A Generation of Efficiency in Edwards Car Devices

YOUR passengers will enjoy the safety, convenience and comfort resulting from a generation of manufacturing efficiency if you equip your cars with Edwards car devices.

Window fixtures
All-Metal Sash Balances
Sash Locks and Racks
Sash Lifts
Anti-Rattle Compression Devices
Metal Stop Casings and Parting Stops
Top, Bottom and Side Weather Stripping
Steel Vestibule Trap Doors
Trap Door Locks and Latches

For thirty-five years our products have met the exacting requirements of the leading railroads. These railroads in turn have benefited from the good will which is bound to develop when the riding public is free from car-window rattle, sticking and binding windows and drafts.

Our A-21 sash lock, illustrated above, for instance, enables the sash to be raised or lowered easily and holds the sash firmly in position. Neither vibration, jars nor jolts will loosen it.

THE O.M.EDWARDS CO., INC.

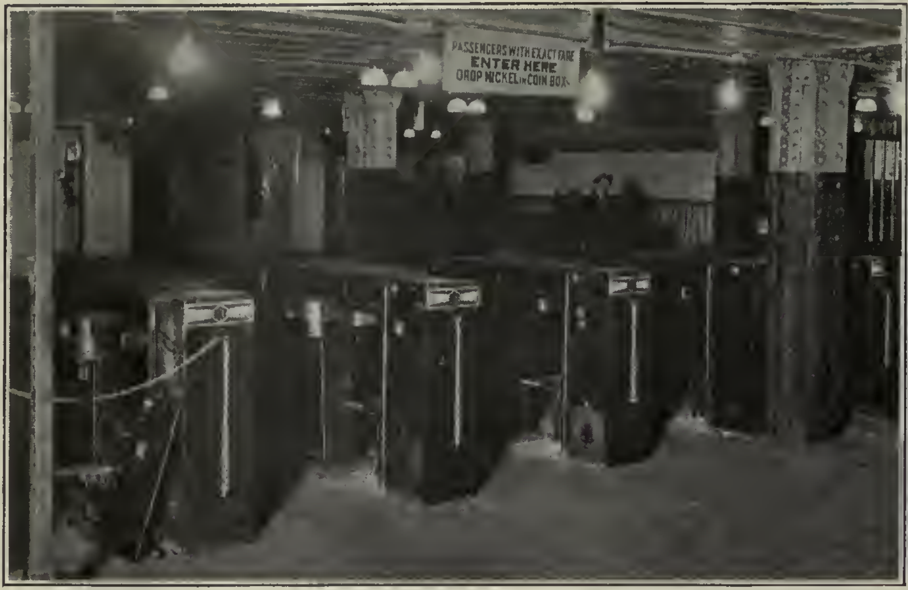
CHICAGO, ILL.
Main Office and Factory
SYRACUSE, N. Y.
NEW YORK, N. Y.

LEADERS SINCE 1887

Perey Passimeters and Turnstiles

for every purpose

Accurate
Efficient
Reliable
Practical
Durable
Substantial



Perey Fare-Collecting Turnstiles

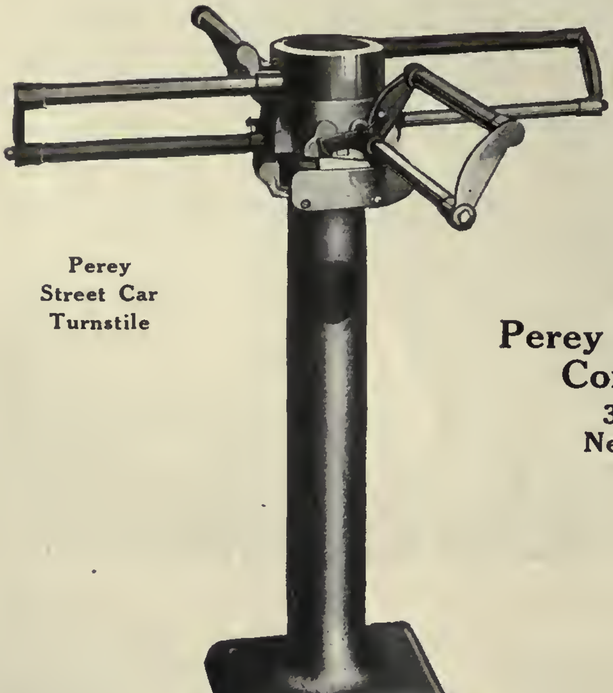
PEREY TURNSTILES

for the Brooklyn-Manhattan Transit Corp.

Above is shown the battery of new type automatic fare collecting and registering passimeters recently installed in the Thirty-Fourth St.-Broadway Station of the Brooklyn-Manhattan Transit Corporation. The equipment was designed by the engineers of this subway system to meet their own conditions—then they turned to us for the practical development and construction of their ideas.

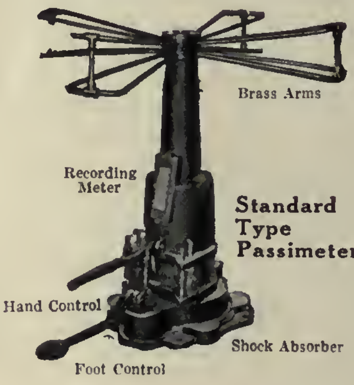
Many years' experience in the building of turnstiles enables us to put progressive ideas into practical working form. We have been leaders in the development of the car turnstile for one-man operation.

Get an experienced builder for your turnstiles

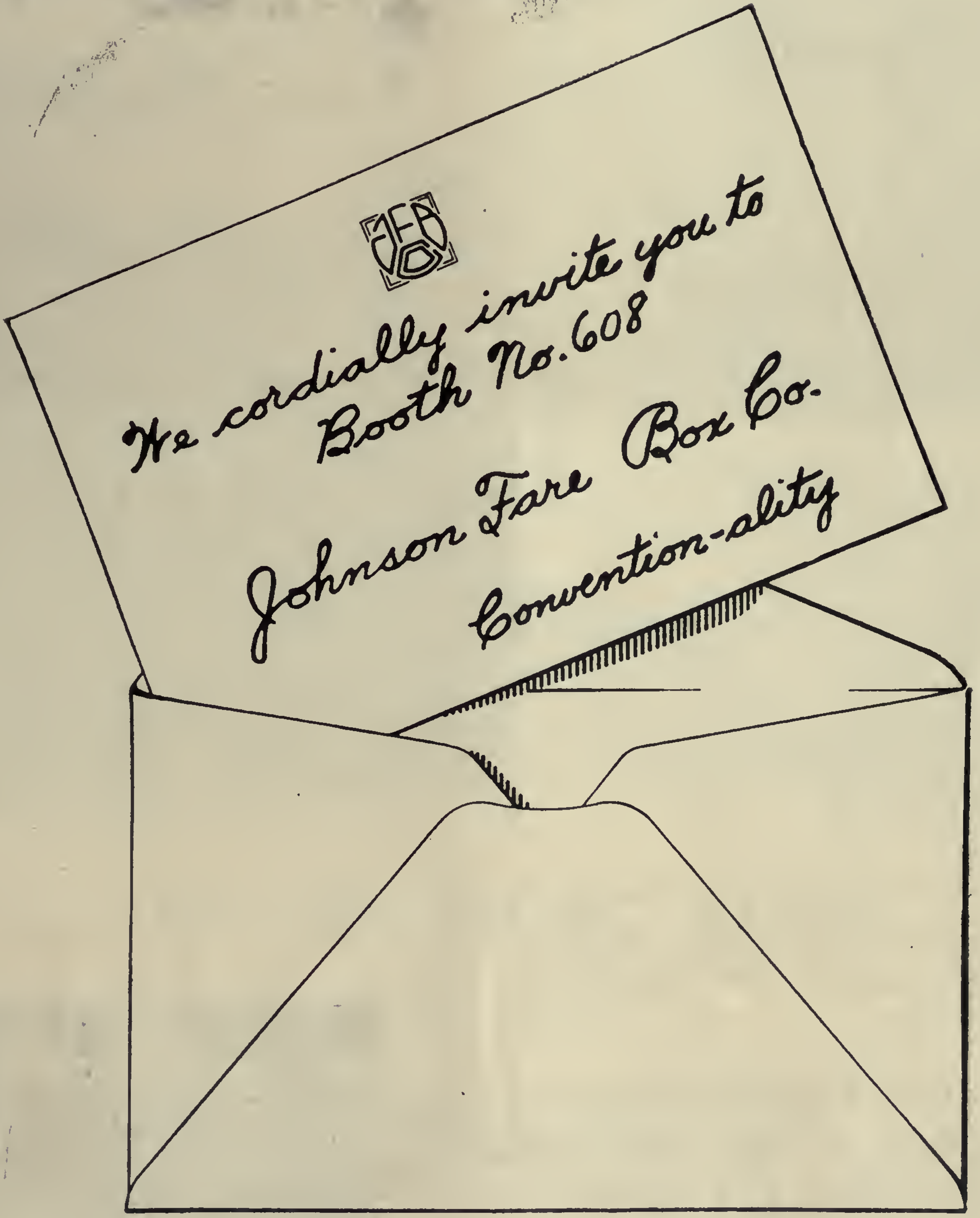


**Perey
Street Car
Turnstile**

**Perey Manufacturing
Company, Inc.**
**30 Church St.
New York, N. Y.**



**Standard
Type
Passimeter**



We cordially invite you to
Booth No. 608

Johnson Fare Box Co.

Convention-ality

An Ohmer Fare Register for Indicating and Recording Fourteen Different Fare Classifications, as Operated in One-Man Car or Motorbus.

Ohmer Fare Registers

They indicate and record each transaction between passenger and conductor

Present day business methods demand that the amount of each retail sale be indicated to the purchaser and a permanent record made of it.

Ohmer Fare Registers apply this correct business principle to the sale of transportation on electric railway cars.

Ohmer Fare Registers are manufactured in a large variety of types and sizes, and every possible operating condition can be met.

OHMER
FARE REGISTER COMPANY
Dayton, Ohio

The No. 62 Detail Fare Printer. This Register Indicates and Records Fares from One Cent in Value up to $9.99 and prints a Detailed Record of each Sale.

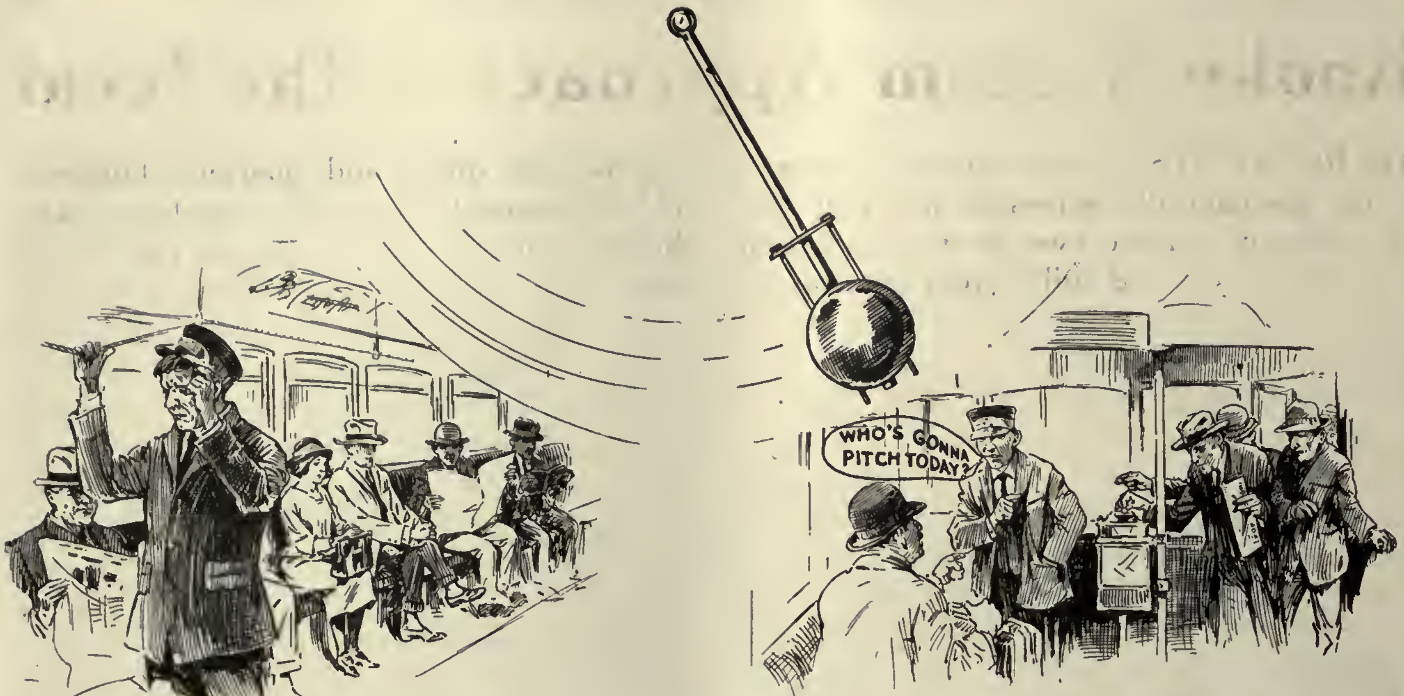
DUSTOOR HAI

(In Person)

—a feature of the A.E.R.A. Convention
In Booth No. 535.

Morganite
Brush Co., Inc.

519 West 38th St., New York City


WHO'S GONNA PITCH TODAY?

—Trusting the Conductor—

—Trusting the Public—

Two extremes in fare collection — both wrong!

—Car Equipment vs. Man Equipment
Confusion vs. Standardization

Like stockings, your fare collection system should be hole-proof! If it isn't, fares will leak through like water through a sieve.

Any sort of container into which money may be tossed, will collect most of the money, of course. The percentage of loss, however, is sufficient to embarrass seriously, an already impoverished industry like the electric railway.

Such methods satisfy certain operators because the loss is unknown and makes no trouble. That the loss is large, however, can be proven by anyone undertaking to check box receipts as against the movement of passengers past any type of fare box on any type of car.

Fare boxes, clock registers, turnstiles, etc., are simply car equipment — mute, impersonal things which go-along-with-the-car. They have defects of their own and further limitations because they depend on things which the car itself cannot provide. In the effort to increase receipts and stop leaks *the industry has been banking too much on car re-arrangements rather than on collection methods and mechanisms which insure proper get-together efficiency in the financial relationships which must exist between passenger, conductor and company.*

News reports recently announced the closing down of a chain of lunch rooms, operated on the "we-trust-the-public" policy.

If the industry we serve had a Judge Landis watching the fare collecting game, play by play, present methods and mechanisms would come in for immediate re-valuation. The pendulum has swung from the old extreme of optional registration by the conductor to the other equally hazardous extreme of operating largely on the we-trust-the-public basis. Merely because you could not entirely trust the conductor is no reason for dispensing with his vitally valuable services. He has become merely a door-man—an observer with less and less interest in the job of observing. The trouble has been too much *car* equipment—too little *man* equipment.

If some Judge Landis were in control he would immediately call on trolley operators for a statement of general principles—representing their ideals as regards fare collection. Undoubtedly the following report and recommendation made several years ago by our A. E. R. A. Committee on Fare Collection, at the Atlantic City Convention would be noted, i.e.—

> *"Your Committee believes that hand collection which is subject to so many discrepancies, should be entirely eliminated and that all collections should be by mechanical registering devices so that the proper fare may be collected and accounted for prior to the time it passes into the hands of the conductor."*

With this workable Golden Text as a conception of the proper practice,—The ideal,—why not attempt to operate on that basis?

Rooke System Approaches the Ideal

The ROOKE SYSTEM principle and register is the mechanically expressed result of the idea that if you are ever to get maximum receipts, protect and utilize your conductors and secure the proper co-operation from passengers when paying their fares—if you are ever to get these things, the register used must, practically speaking, become *a part of the conductor, a part of the passenger, and a part of the company. These three factors must get together the instant of payment. Their interests, attention and physical moves at the instant of fare payment, must be absolutely conjoined.*

The ROOKE register is not car equipment. *It is fare collecting service.* The register goes along with the conductor on *any* type of car, becomes a handy feature of personal convenience,—*a spur to secure both his best efforts and a check positively deterring him from error.* It leaves the field wide open for *any* car arrangement. *The passenger always pays the same way. The register always operates the same way.* The transaction is always on the basis of the passenger (1st), to company (2), to conductor (3d). Passenger becomes *habituated* to the method of payment. Instead of 2 or 3 different kinds of boxes and overhead registers with punch cards, cash receipt schemes, turnstiles, etc. *every fare collecting contingency is covered by the ROOKE register.*

One large company now uses 973 ROOKE registers. They operate scores of buses collecting nickels, dimes and quarters; hundreds of prepayment, pay-enter, pay-leave cars; hundreds of one-man cars, open cars, street collections, etc., collecting *nickels, dimes* and *metal tickets.* There standardization on one register, one method of accounting, etc., not only makes possible large economies in operation, but *holds fast* and *develops* a quality of *passenger co-operation* impossible with any other method of fare collecting. THE *QUALITY* OF PASSENGER CO-OPERATION YOU RECEIVE DETERMINES YOUR SUCCESS IN FARE-COLLECTING.

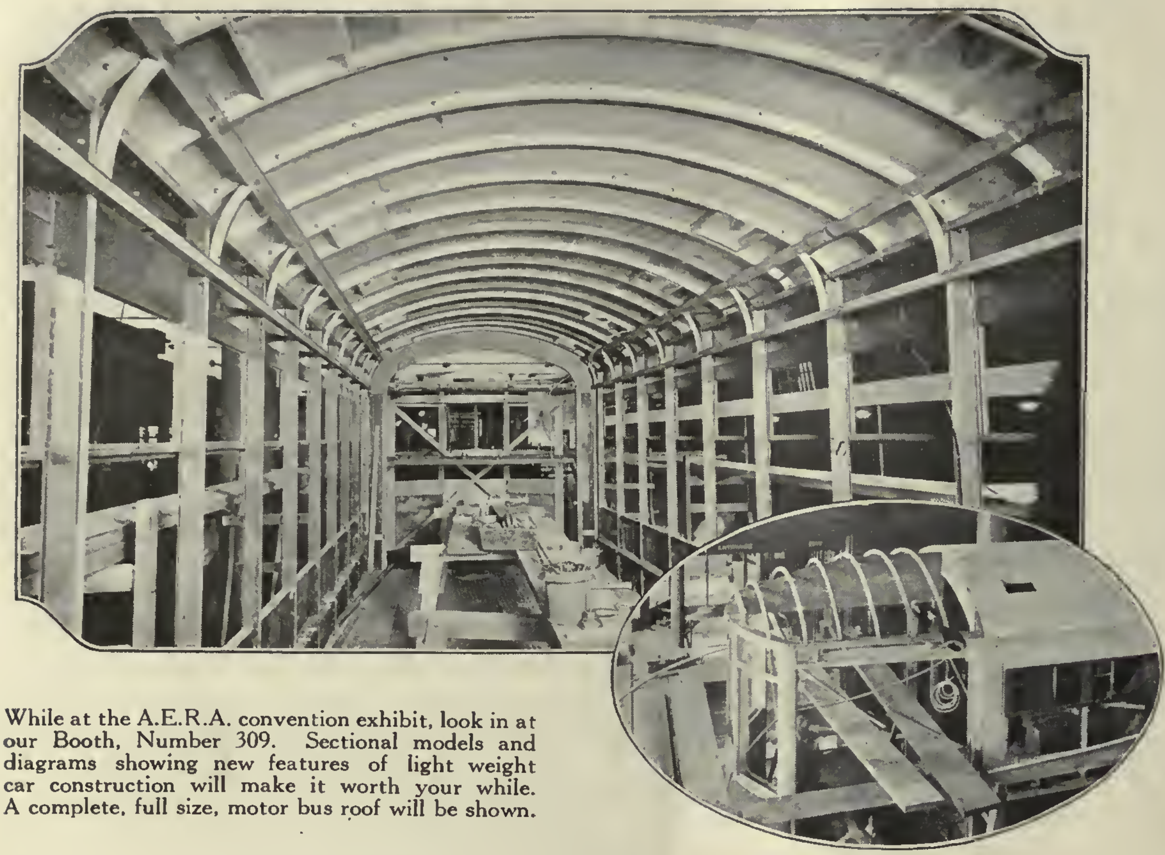
On the one-man car, the company above mentioned has the ROOKE register placed in a holder or stand giving the operator both hands free. When it is necessary to go after fares or leave the car for work on some other type of car, the register is easily lifted from the holder and becomes again the familiar portable fare collector—the one record of this one conductor's work no matter on how many cars he has worked.

The new capacity ROOKE register makes all this possible. The old one-coin ROOKE is a memory. The new machine "grips" the nickel, dime, quarter, or metal ticket and "tugs" the coin into the *one* ample slot mouth, then *swallows, registers, rings* and *disgorges* the money INSTANTLY. The ROOKE pioneered the idea of *instantaneous registration* and best exemplifies it in practice.

Write us for facts, illustrations, etc., and we can indicate a standardization possible in your operation and the benefits which might reasonably be expected to result.

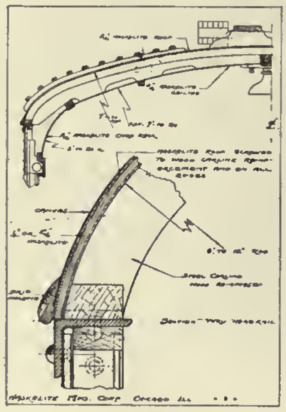
ROOKE AUTOMATIC REGISTER COMPANY

PROVIDENCE, R. I.



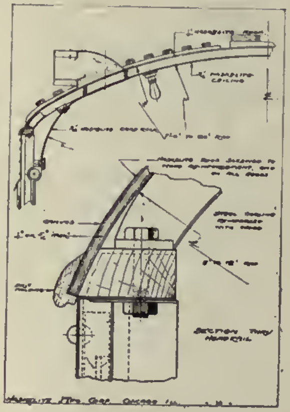
While at the A.E.R.A. convention exhibit, look in at our Booth, Number 309. Sectional models and diagrams showing new features of light weight car construction will make it worth your while. A complete, full size, motor bus roof will be shown.

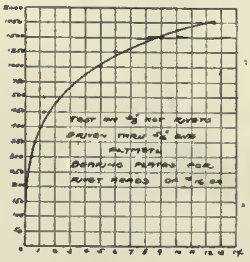
For sturdy, lightweight constructio



HASKELITE

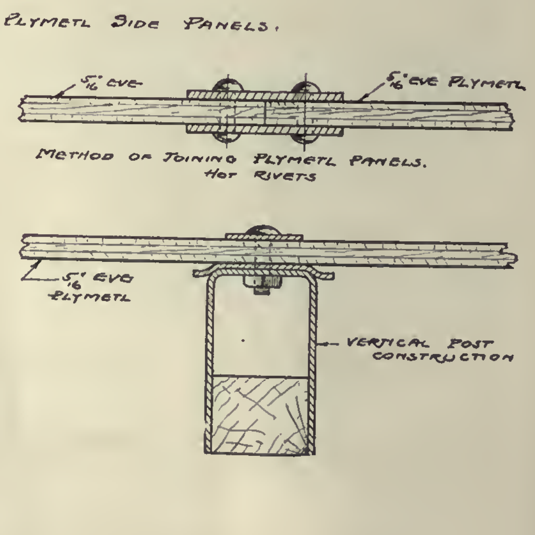
offers an engineering material of well-known structural properties. Its use simplifies construction details. HASKELITE roofs, for example, eliminate the time-wasting cutting and fitting of matched tongue-and-groove. Accurate time records show that labor hours are cut in half by HASKELITE. Moreover, the finished roof is lighter and more durable. Considered from every standpoint the HASKELITE car or bus roof is a distinct improvement over conventional wood or metal constructions.

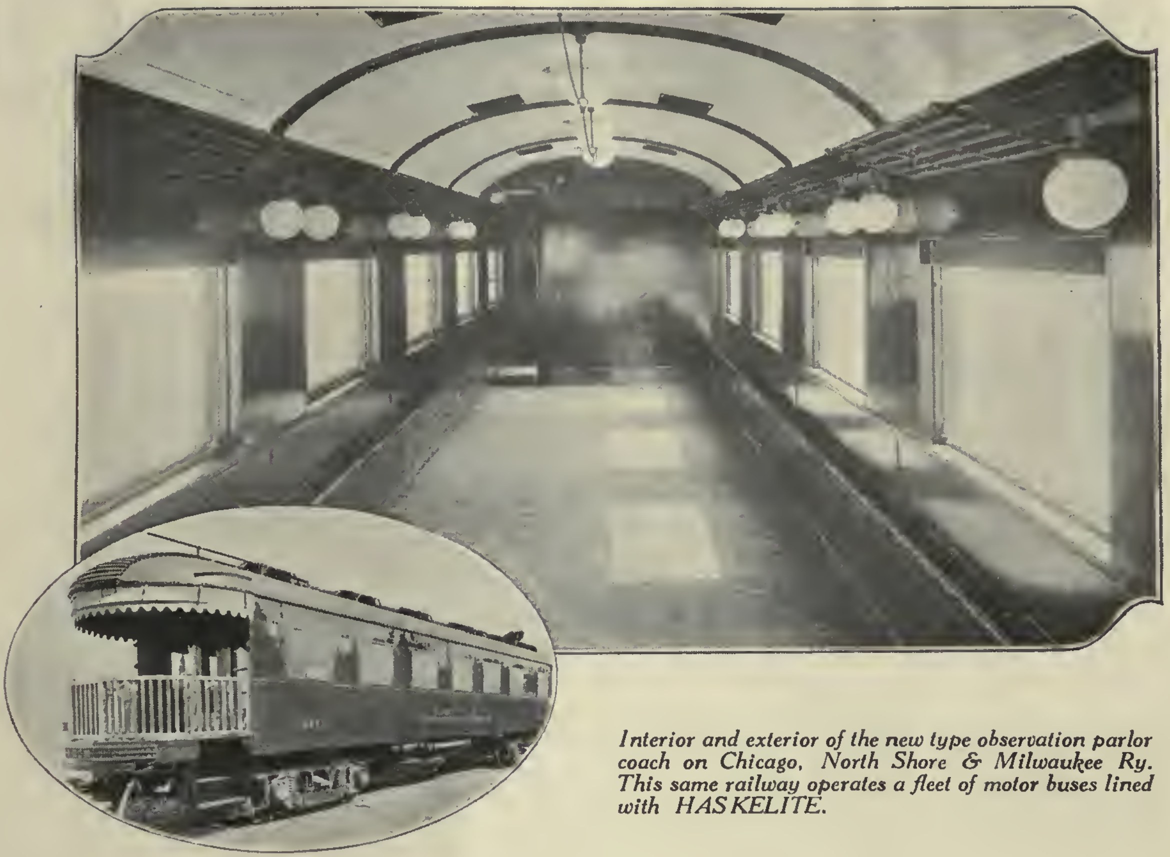




PLYMETL

is HASKELITE with steel exterior. For side panels, it furnishes excellent heat insulation, is proof against indentation, and properly painted is handsome, strong and lasting. Notice the graph at the left giving the results of tests made on hot rivets in PLYMETL.

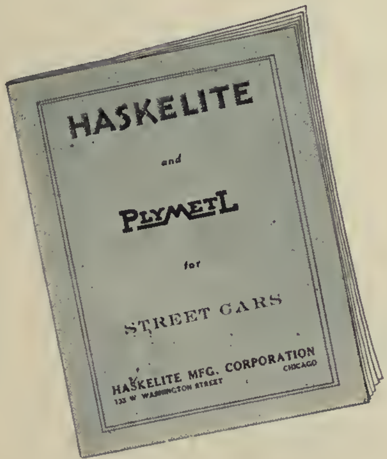




Interior and exterior of the new type observation parlor coach on Chicago, North Shore & Milwaukee Ry. This same railway operates a fleet of motor buses lined with HASKELITE.

—for handsome luxurious interiors

Luxury of appearance is coupled with sturdy construction when HASKELITE linings are used. In these new parlor cars built by the Cincinnati Car Company for the Chicago North Shore & Milwaukee (Electric) Railway. The genuine mahogany top ply is proof against splitting, shrinking or warping, and is easily accepted as superior to solid mahogany, and because of the waterproof glue is better than other types of veneer for this purpose.



HASKELITE
and
PLYMETL
for
STREET CARS
HASKELITE MFG. CORPORATION
133 W. WASHINGTON STREET
CHICAGO

Remember the new booklet, containing working drawings and data covering the use of HASKELITE and PLYMETL in car and bus construction. You will want to be informed on this rapidly developing use. Send for your copy now.

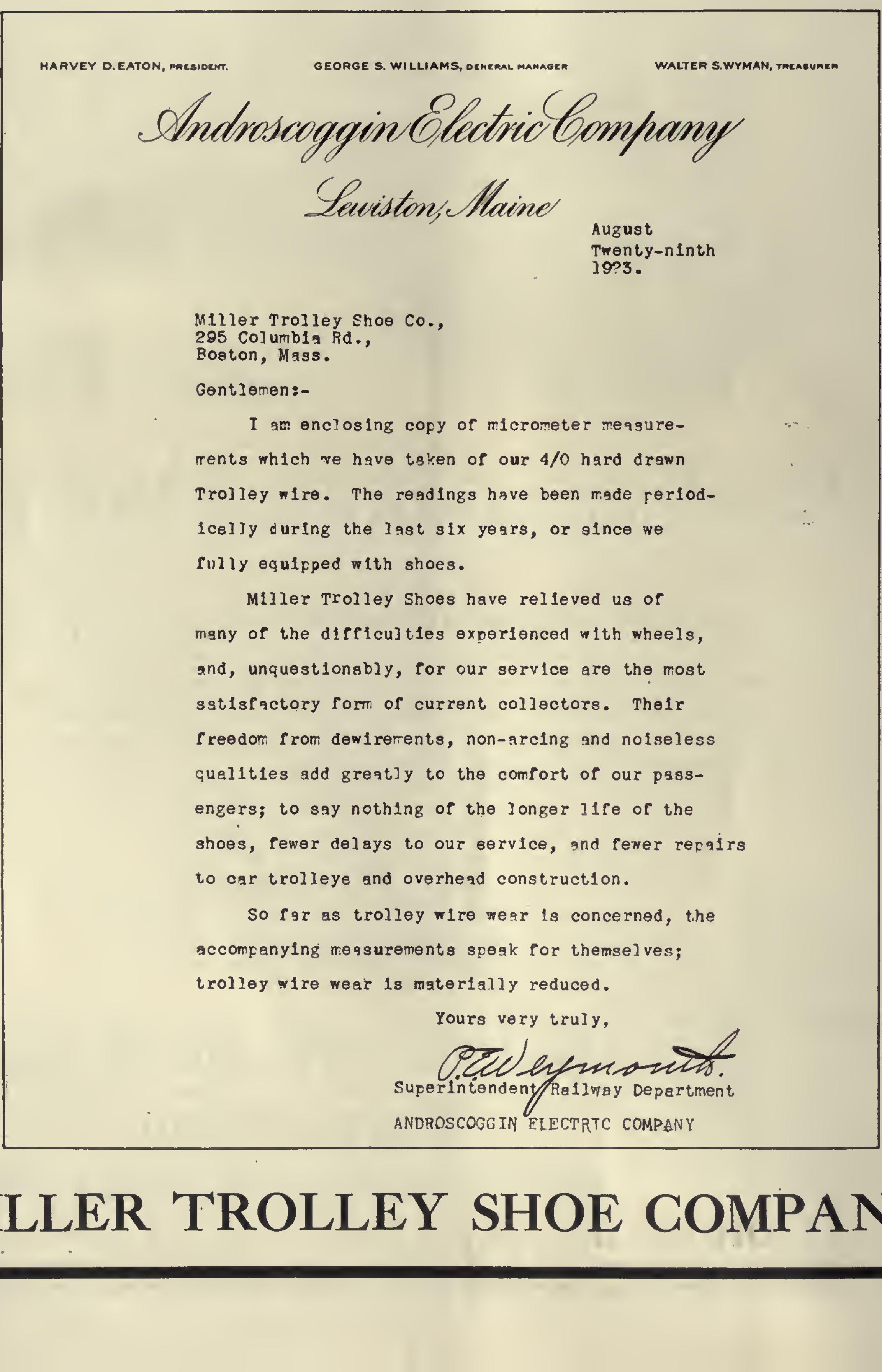
Haskelite Manufacturing Corporation

133 W. Washington St., Chicago, Ill.

¶ *Thirty-five new street cars for Milwaukee will have Haskelite linings.*

MILLER TRO

Here is the answe



HARVEY D. EATON, PRESIDENT. GEORGE S. WILLIAMS, GENERAL MANAGER WALTER S. WYMAN, TREASURER

Androscoggin Electric Company

Lewiston, Maine

August
Twenty-ninth
1923.

Miller Trolley Shoe Co.,
295 Columbia Rd.,
Boston, Mass.

Gentlemen:-

I am enclosing copy of micrometer measurements which we have taken of our 4/0 hard drawn Trolley wire. The readings have been made periodically during the last six years, or since we fully equipped with shoes.

Miller Trolley Shoes have relieved us of many of the difficulties experienced with wheels, and, unquestionably, for our service are the most satisfactory form of current collectors. Their freedom from dewirements, non-arcing and noiseless qualities add greatly to the comfort of our passengers; to say nothing of the longer life of the shoes, fewer delays to our service, and fewer repairs to car trolleys and overhead construction.

So far as trolley wire wear is concerned, the accompanying measurements speak for themselves; trolley wire wear is materially reduced.

Yours very truly,

P.W.Weymouth.
Superintendent Railway Department
ANDROSCOGGIN ELECTRIC COMPANY

MILLER TROLLEY SHOE COMPANY,

LLEY SHOES

on wire wear—

Here are the figures which prove that wire wear is less

On a thirty-mile stretch of 4/0 hard-drawn copper trolley wire on the Portland-Lewiston Interurban Railway, forty-five points were marked in 1917 and have been measured annually since. The last measurements were made a few weeks ago and show an average yearly wear of *less than three one-thousands of an inch,* (0.003 in.) so that covering a period of six years during which this property has been *fully equipped with Miller Trolley Shoes* we find a *total average wear over forty-five points of fifteen one-thousands of an inch* (0.015. in.).

This property has approximately sixteen thousand car passes per year, and *all movements are made with Miller Shoes.*

Recently a number of companies have determined the life of their trolley wire in terms of car passes; where wheels are used. Three companies with 4/0 wire found that it must be replaced after an average of 1,982,655 car passes.

Six companies with 2/0 wire found that it must be replaced after an average of 948,266 car passes?

But these companies do not use Miller Shoes. Miller Shoes would have given considerably over two million car passes based on this six years test on the Portland-Lewiston Interurban Railway.

Exhibited at A. E. R. A. Convention. Our representative will gladly furnish further details. Examine the Trolley Shoe proposition while at the Convention. Space 616, (*Economy Electric Devices Co.*)

295 Columbia Road, Boston (21), Mass.

In Summer—
there seems to be no limit to the work you can find for all your Differential Cars.

Differential

Over two hundred cars on forty-five railways—

FROM Canada to the Gulf of Mexico, from East Coast to West Coast, Differential Cars are used by leading railways. They are found to be a *paying proposition,* on small roads as well as large. One big city company finds profitable use for twenty-five. Another keeps twenty-one Differentials busy.

Even the smallest road can bolster up its earnings with one or more Differentials. Let us tell you about the new snow plow attachment for Differential Cars. Now is the time to act for early deliveries.

See us at the Convention—Atlantic City—Space 583

The Differential Steel Car Co

ork the whole year long!

From January to December

Differentials will save or earn in these activities

LAYING PAVING
HANDLING COAL
PLOWING SNOW
HAULING FREIGHT
ASH DISPOSAL
SNOW REMOVAL
ON TRACK CONSTRUCTION
ON TRACK MAINTENANCE
HIGHWAY CONSTRUCTION
AS ELECTRIC LOCOMOTIVES

In Winter—

from the first snow fall, till the ground begins to melt, Differentials are valuable allies of the Transportation Department.

indlay, Ohio

Kalamazoo

trolley wheels and harps

THE VERY FACT that Kalamazoo Trolley Harps and Wheels are made by the largest concern of its kind in the World is in itself an indication of their standard.

Our products are made in a shop devoted exclusively to these specialties. Today we are supplying the major part of the entire demand of the United States. There must be a reason for this, and there *is*. And that is, a high reputation due to high quality.

Kalamazoo Trolley Harps and Wheels have been endorsed by the leading electric roads since their inception on the market, over 25 years ago.

Kalamazoo Harps give perfect and continuous contact, and are designed to permit easy replacement of wheels. There is only one cotter pin to be taken out to remove the wheel.

They are balanced for easy running and freedom from slippage. They do not wear down and damage the wire, for wire life is more important than wheel life.

Kalamazoo wheels are made of virgin metal—pure lake copper—they are of proper design for the intended service, and are honestly manufactured.

STAR BRASS WORKS

Kalamazoo, Michigan

The largest exclusive manufacturers of trolley wheels in the world

"Designed for passenger comfort
Built for practical service"

Visit the Display of

HALE & KILBURN CAR SEATS

On the Pier

SPACE 406-408

Standard Interurban Steel Seat

Standard Rattan Walkover Steel Seat

Lightest Weight Stationary Steel Seat

Lightest
Strongest
Simplest
Neatest

Hale-Kilburn Company

PHILADELPHIA

General Office and Works:
Sales Offices:

New York, 30 Church St.
Chicago, McCormick Bldg.
Richmond, Mutual Bldg.
Atlanta, Candler Bldg.
San Francisco, 71 First St.
Los Angeles, 447 E. 3rd St.

Hale and Kilburn SEATS

See these
Coils on
Exhibit in Booth
No. 616

MORE THAN 6

LIND

ALUMINUM field coils have marked engineering and economic advantages.

More than a year's experience in the sales and engineering development of aluminum field coils has shown that the principle is fundamentally correct.

Accordingly contracts have been closed which give L. E. Gould and his business associates complete control of the design and production of Aluminum Feld Coils, manufactured under the Lind Patent Process.

LECTRIC RAILWAYS ARE NOW USING

LUMINUM FIELD COILS

THE Lind method of winding and insulating aluminum field coils for D.C. motors was introduced into this country about two years ago, after fifteen years' use in European countries. It employs square aluminum conductors insulated by the aluminum oxide process.

The characteristic relations between the cross sectional areas and corresponding resistances of aluminum and copper, and the per cent saving in weight, are such that for the aluminum coil resistance to equal the copper resistance, the cross sectional area of the aluminum conductor must be increased 59%—and when increased by that amount the *saving in weight is* 52%. The foregoing is based on the aluminum coils having the correct number of turns.

For railway motor field coils wound with round copper wire, we can make the aluminum cross section large enough to give coils of equal or lower resistance than the standard copper coils.

For many strap-wound coils we can say the same; for a few we are obliged to increase the resistance a few per cent.

For coils wound with rectangular or square copper we cannot meet the copper resistance within the usual tolerances.

Theoretically a copper coil weighing 100 lb. rewound in aluminum of equal resistance, would weigh 47 to 48 lb.—that is, the conductor alone—and there would also be the saving by whatever amount the weight of the insulating material on the copper coil was greater than the weight of the aluminum oxide and the layer of paper which we use between aluminum coil layers.

The provision of ample insulation between turns is handled very satisfactorily with the aluminum oxide, since its use takes advantage of the characteristic of aluminum which was once an objectionable feature in the use of aluminum cable for high-tension transmission work—namely, the difficulty of making joints, even for high voltages.

The exterior of the Lind coils is treated as you may wish it, providing our standard wrapping does not fulfill your specifications, and the largest interurban fields are of such low weight that mounting spools are not required.

These coils are designed to give the same field strength as copper coils and also the following advantages; longer life, fifty per cent weight reduction, quicker conduction of heat, less affected by moisture, less chafing, less renewals and less total cost.

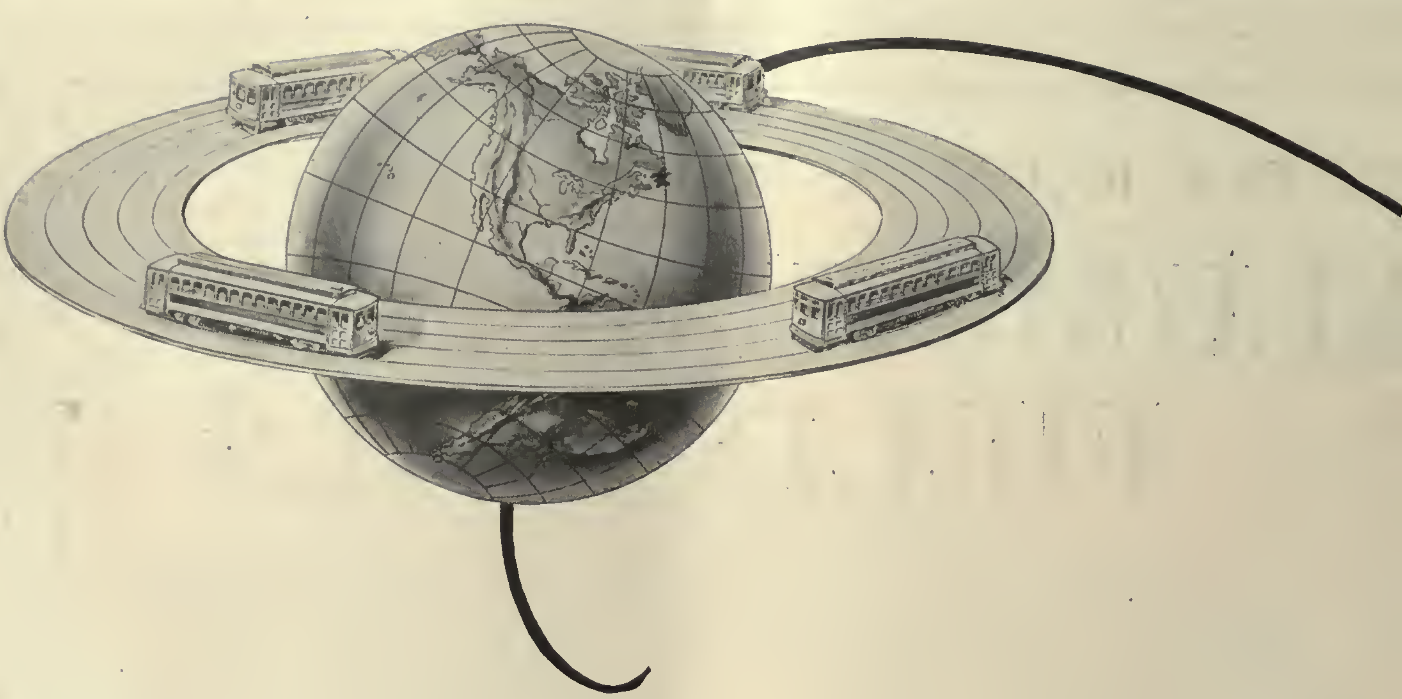
Economy Electric Devices Company

L. E. Gould, Pres., Old Colony Bldg., Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco
Burton R. Stare Co., Seattle
Cable Address: Sangamo, Chicago

GENERAL SALES AGENTS:
Sangamo Economy Meters
Lind Aluminum Field Coils
DISTRICT AGENTS:
Peter Smith Heaters—Woods Fare Boxes
Bemis Boyerized Truck Specialties
Miller Trolley Shoes

Ludwig Hommel & Co., Pittsburgh
Grayson Railway Supply Co., St. Louis
Detroit Railway Supply Co.
Alfred Collyer & Co., Montreal, Quebec



"Meet Me at the COLLIER Booth"

A cordial invitation is extended to A.E.R.A. members and their friends to make the Collier Service booth their headquarters during the Convention at Atlantic City.

Conveniently located near the entrance of the Convention Hall, the Collier booth is an ideal meeting place. Comfortable chairs in a restful atmosphere await you there. You are welcome at all times.

Telephone and Telegraph Service.

Collier Service

If

The Keystone Mark signifies as much to the electric railway industry as the Boardwalk does to Atlantic City.

TRADE MARK

ou don't get to the Convention—

here's a 688 page book of Keystone Exhibits—our new CATALOG NO. 7

KEYSTONE
CAR SPECIALTIES

Illuminated Destination Signs
Steel Gear Cases
Motormen's Seats
Faraday Car Signals
Lighting Fixtures
Golden Glow Headlights
Headlight Resistances
Air Sanders
Trolley Catchers
Shelby Trolley Poles
Rotary Gongs
International Fare Registers
Fare Register Fittings
Samson Cordage
Air Valves
Cord Connectors
Trailer Connectors
Automatic Door Signals
Standard Trolley Harps
Standard Trolley Wheels

ou haven't ttended the .E.R.A. Convention ntil you have seen the

KEYSTONE EXHIBIT IN SPACE 414

ervice Supplies Co.

PHILADELPHIA
17th and Cambria Sts.
PITTSBURGH
829 Oliver Building

NEW YORK
50 Church St.
SCRANTON
316 N. Washington Ave.

CHICAGO
Monadnock Bldg.
BOSTON
88 Broad St.

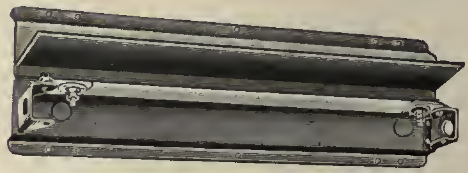
National Rai

Rely on the "NATIONAL LINE" to simplify your equipment problems

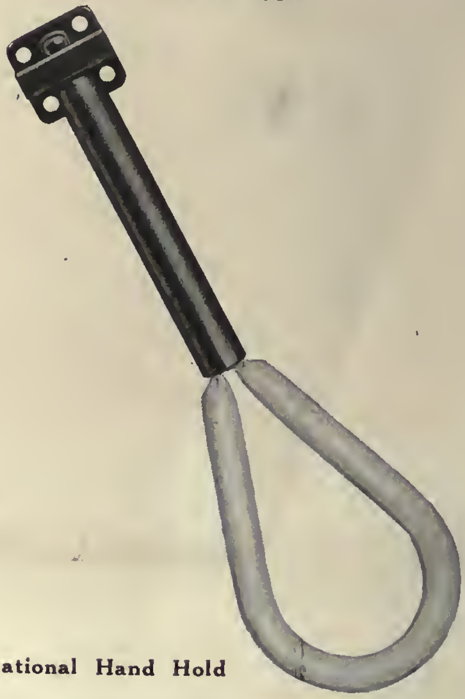
- Anglo-American Varnish Co., Varnishes, Enamels, etc.
- Tool Steel Gears and Pinions.
- Yellow Coach Mfg. Co., Buses.
- Economy Electric Devices Co., Power Saving and Inspection.
- Lind Aluminum Field Coils.
- Turnstile Car Corporation. Turnstiles.
- E-Z Car Control Corporation Safety Devices, Meters.
- Garland Ventilators.
- C-H Electric Heaters.
- Anderson Slack Adjusters.
- Drew Line Material and Railway Specialties
- National Hand Holds.
- Fort Pitt Spring & Mfg. Co., Springs.
- Pittsburgh Forge & Iron Co.'s Products.
- Genesco Paint Oils.
- Flaxlinum Insulation.
- Dunham Hopper Door Devices.

Low Prices
All High Grade Material
Wonderful delivery
Good service all the time

The Cutler-Hammer Heating Unit



C-H Electric Car Heater
Panel Type



National Hand Hold

NATIONAL RAILWAY

B. A. Hegeman, Jr
Charles C. Castle, First Vice-President
W. C. Lincoln

Grand Central Terminal, 452

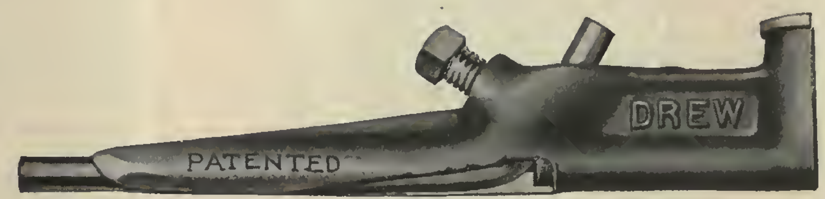
BRANC

Munsey Bldg.
Washington, D. C.

Hegeman-Castle Corporation
Railway Exchange Bldg., Chicago

way Specialties

"The Watchdog of Your Power"
Economy Electric Meters



Strain Insulator (Drew)

Drew Line Material

Garland Ventilators

Anderson Slack Adjuster

Tool Steel Gears and Pinions

APPLIANCE COMPANY

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Harold A. Hegeman, Vice-Pres. and Treas.
anager Sales and Engineering

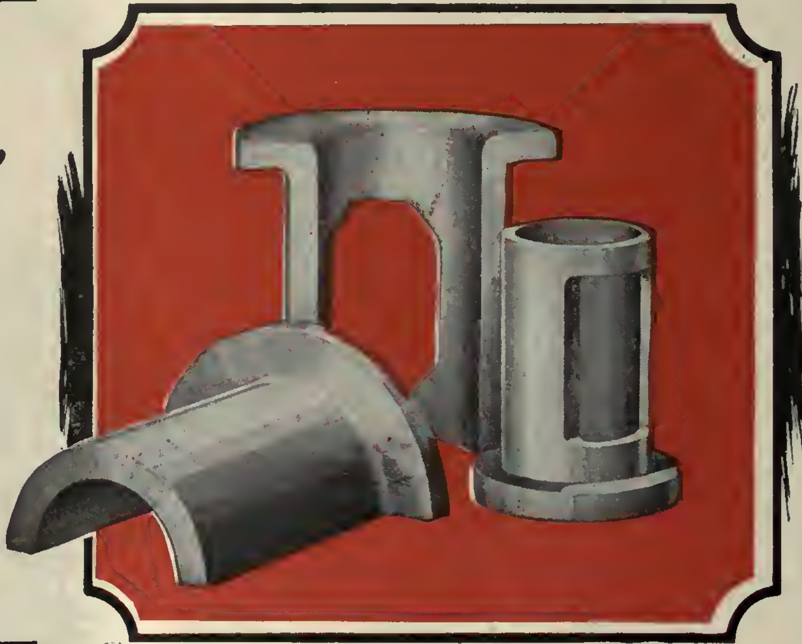
exington Ave., Cor. 45th St., N. Y.

FICES
100 Boylston Street
Boston, Mass.

Only

VK

Oilless Trolley
Wheels and Non
Arcing Harp-



"TIGER"
Bronze Axle
and Armature
Bearings

M J
Armature
Babbitt

MORE —

Comparable with the finest equipment you buy

What we all want is good service and most of us are willing to pay what we consider a fair price for it.

Good equipment and materials give good service —Cheap and inferior materials give poor service and poor service never pays.

Every More-Jones product is designed and manufactured to give good service and to increase the profits of railways through the reduction of operating and maintenance costs.

That's why so many railways specify More-Jones trolley wheels and harps, "Tiger" Bronze axle and armature bearings and armature babbitt metal. And remember More-Jones prices compare favorably with the cheaper substitutes.

Quality Products

Trolley Wheels

Buy Trolley Wheels with the same care that you buy wire—the life of the wire is largely dependent on the quality of the wheels. More-Jones Wheels are made of a special alloy that is comparatively soft, yet extremely tough and durable, with the highest conductivity. The V-K Oilless trolley wheel with the non-arcing harp will do more to reduce trolley maintenance than any other current collector on the market.

"TIGER" Bronze

Exceptional toughness and anti-frictional qualities of "Tiger" Bronze insures great strength and a very slow and even rate of wear. These qualities result in a perfect bearing alignment and greater mileage. "Tiger" Bronze will save its cost many times over in a year.

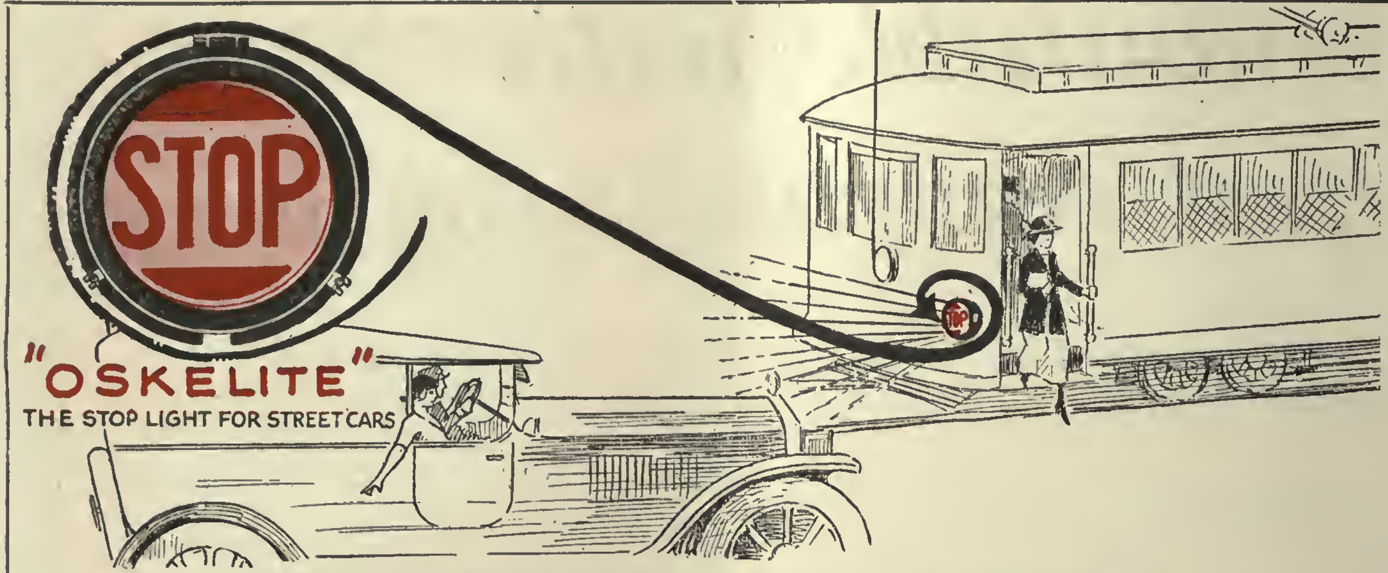
Armature Babbitt

Service—not first cost—is the basis on which M-J Armature Babbitt is sold. More-Jones experts, with more than 40 years of experience to guide them, compounded this excellent babbitt for the railway field exclusively. It is pure tin, copper, antimony and metallic nickel, alloyed to the highest degree of practical utility—there is not a trace of lead in it. Specify M-J *only* for armature bearing service.

Write for Complete Data

JONES BRASS & METAL CO.

ST. LOUIS, MISSOURI


STOP
"OSKELITE"
THE STOP LIGHT FOR STREET CARS
STOP

PREVENTION—PROTECTION

Stop Light Signals are needed.

The automobile has proven that.

Prevent rear end collisions and you automatically prevent delays.

Protect your passenger and you automatically protect public relations.

Show your passengers that you are trying to protect them.

The Oskelite operates from the brake system and signals BOLDLY to all rear traffic. It signals only when it is necessary and enables you to speed up schedules by keeping the loading area free for the entrance and exit of passengers.

A sample equipment is waiting for you.

The Oskel Equipment Co., 940 McCormick Bldg., Chicago, Ill.

"SAFETY FIRST"

Gain the fullest economies of the one-man safety-car principle

There's no longer any doubt as to the economy and efficiency of the Birney One-Man Safety Car, in many classes of service. But there are safety cars, and safety cars—some of which embody the main principles without attempt at further development—others which, in their design and construction, express the highest achievement in comfort, practicability, and economical operation.

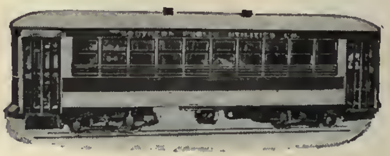
Safety cars built by Perley A. Thomas, have been placed in this latter class by concensus of railway opinion. They are the result of pioneer experience in this field coupled with a keen appreciation of practical railway requirements. Thomas-built "Safety's" have now achieved an enviable reputation for maximum operating economy.

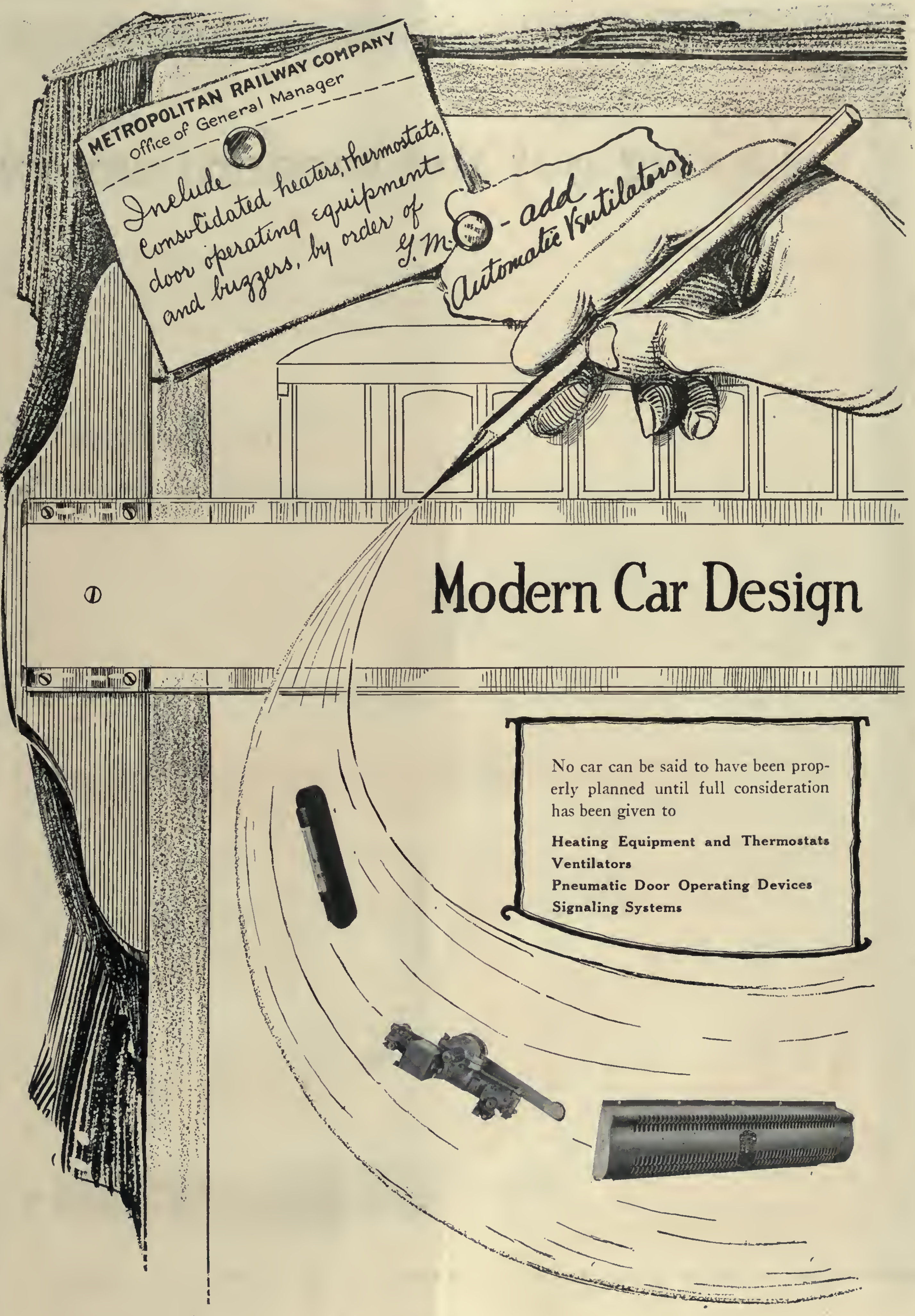
We'll gladly quote on your requirements.

Perley A. Thomas Car Works
High Point, N. C.

Cars of all types from
Birney One-Man Safety to
Large City and Interurban

Whatsoever your car requirements, we can fill them to your entire satisfaction. Give us a trial.




METROPOLITAN RAILWAY COMPANY
Office of General Manager
Include Consolidated heaters, thermostats, door operating equipment and buzzers, by order of G. M.
- add Automatic Ventilators

Modern Car Design

No car can be said to have been properly planned until full consideration has been given to

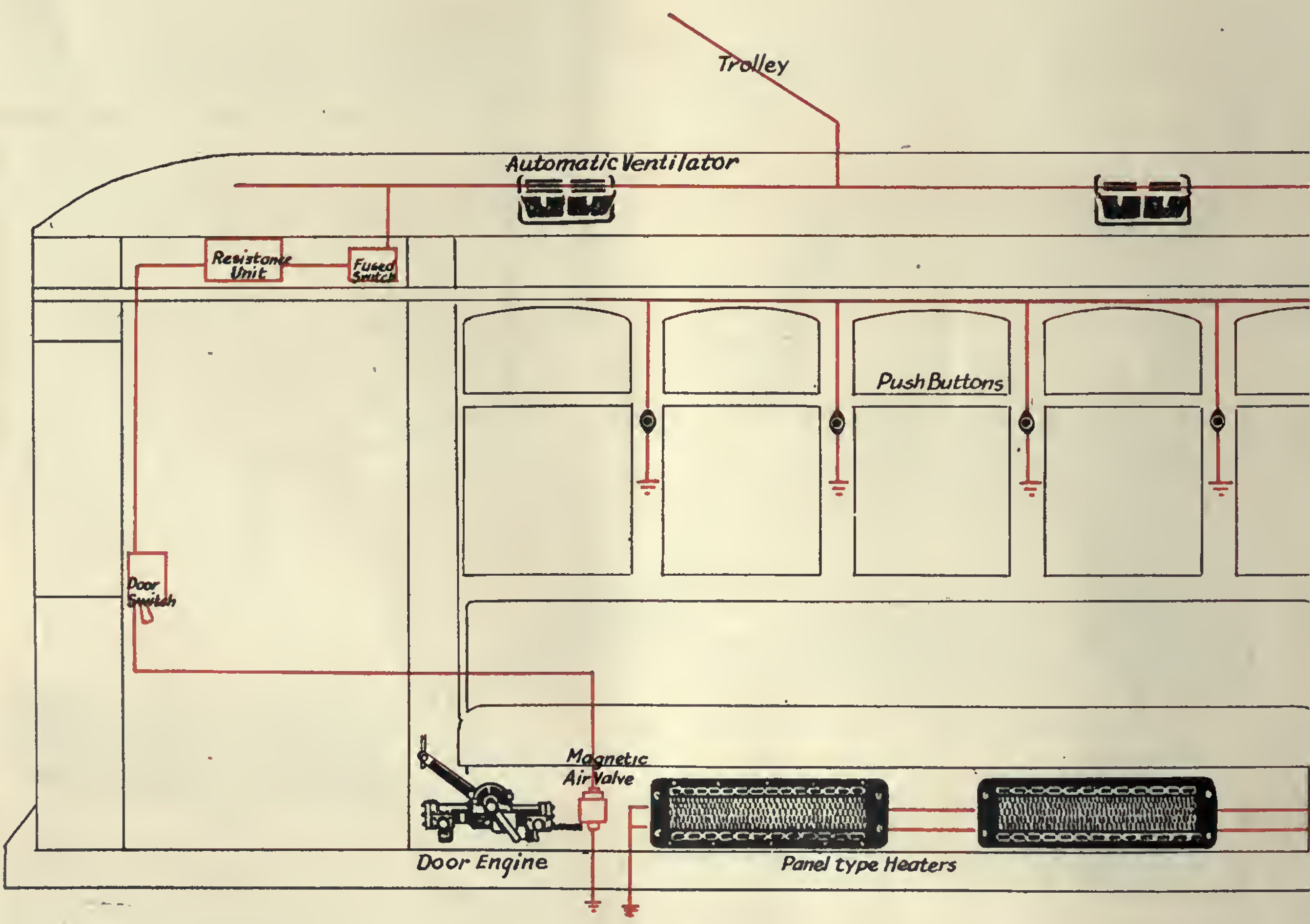
Heating Equipment and Thermostats
Ventilators
Pneumatic Door Operating Devices
Signaling Systems

Laying out the modern car wit

Everything needed in planning new cars, or modernizing old ones, for heating, ventilating, signaling and door operation is found in the Consolidated Line. Operating data and cost statistics are available.

Consolidated Ca

Exhibiting at A. E. R.

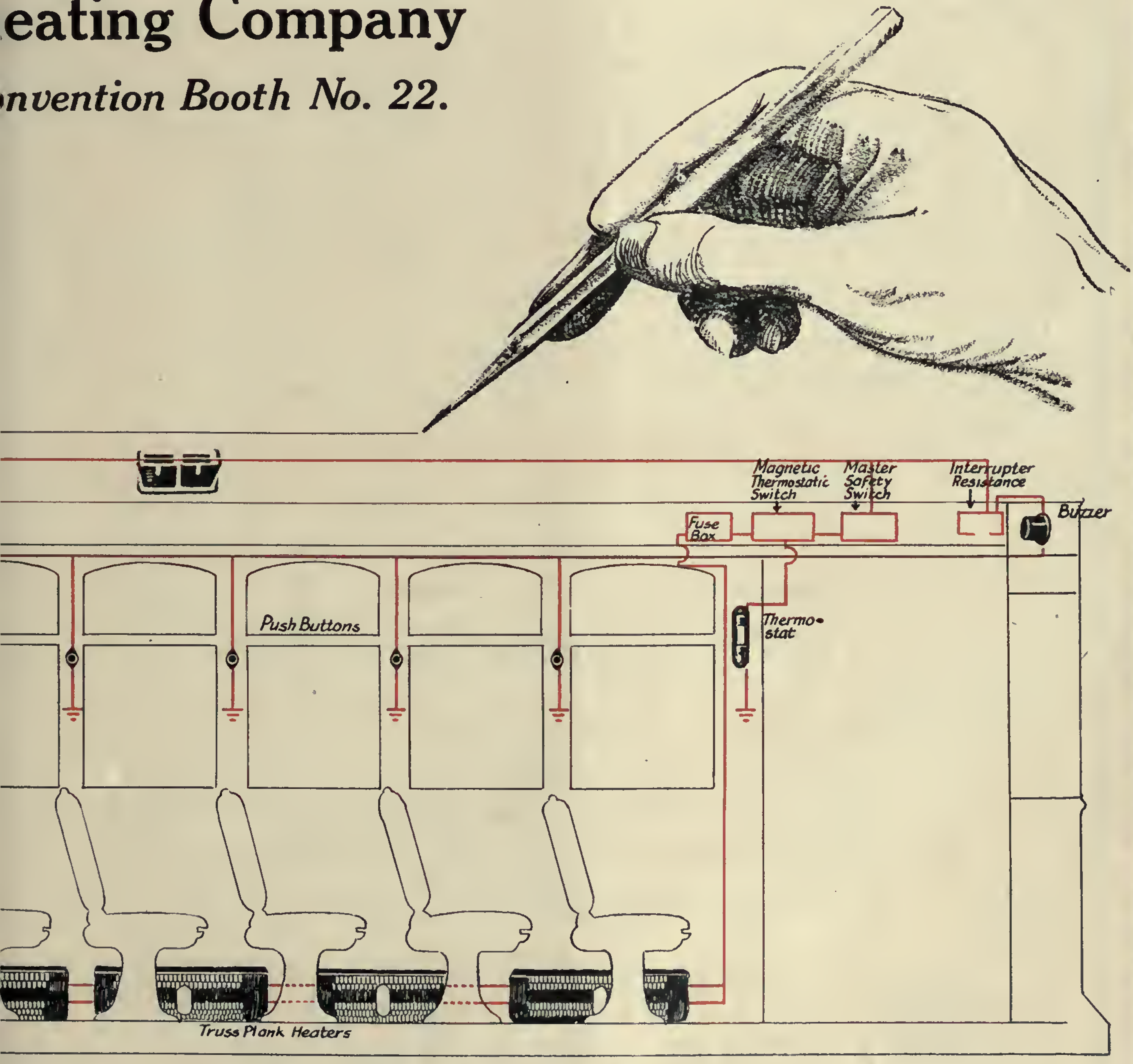


odern Consolidated Equipment

Look over the diagrams below and consider them in connection with the design of your cars. Our engineers with widest experience in the application of car equipment are at your service.

eating Company

nvention Booth No. 22.



METROPOLITAN RAILWAY CO.
(Engineering Department)

Note G. M's Instructions

(1) Heater Equipment
8 Double coil Truss Plank Heaters
4 " " Panel Heaters
1 Cab Heater – Independent Control
1 Safety Switch
(2) Thermostatic Control Equipment
(3) Door Opening Equipment
4 Door Engines with Safety by-pass valves – necessary control Switches, magnetic valves, etc. – to make a complete operating equipment –
(4) Buzzer Equipment
To include 28 Push buttons #2337 and 2 single stroke bells –
(5) 8 Sets of Automatic Ventilators per car

CONSOLIDATED CAR-HEATING CO.
Chicago New York Albany

Freedom from Brush Troubles

N C C

This trade mark on the brushes you use on your traction and compressor motors, as well as on your rotary converters, generators, and other power house and sub-station equipment, assures you freedom from brush troubles. You are cordially invited to visit our exhibit at Booth 604, A. E. R. A. Convention, Atlantic City, October 8-13. We will have a full display of our products, with the high quality of which most of you are familiar.

NATIONAL CARBON COMPANY, Inc.
Long Island City, N. Y.

Carbon Products Division: P. O. Box 400, Cleveland, Ohio

—Service!

Samson Spot Trolley Cord

(waterproofed)

is firmly braided and smoothly finished and is thoroughly waterproofed. We inspect Spot Cord carefully and guarantee it free from imperfections of braid or finish. It does not stretch, shrink nor swell like common cord.

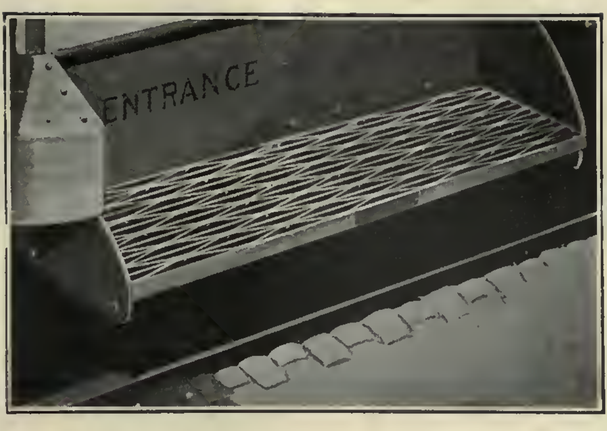
The Colored Spots are our trade mark, used only with this extra quality.

Samson Bell and Register Cord

is made in drab and mahogany colors and in white, with wire centre if desired. Its smooth finish offers the greatest resistance to abrasion and makes it the most durable material for the purpose.

Send for samples and full details

Samson Cordage Works
88 Broad St., BOSTON, MASS.



IRVING SAFSTEP

TRADE MARK

(PATENTED) REG. U.S. PAT. OFF.

ABSOLUTELY NON-SLIPPING ALWAYS

Whatever the type or character of your car equipment, and whether for city or interurban traffic, **Irving Safsteps** will mean greater safety and comfort for your passengers, and lower step-accident hazard for you.

Absolutely Non-Slipping—under all conditions—wet or dry—even with snow or ice upon them.

Extremely Light Weight, with the utmost of strength and rigidity.

Permanently Non-Slipping—no abrasive insets, no bars or mats to wear out and work loose.

Practically Indestructible, because made of steel members solidly riveted up in a self-contained unit.

Cleanly, because dirt and dust fall through and are not tracked into the car.

Economical, because time-proof and wear-proof, and adapted to any type or size of car.

Think of the dollars-and-cents value of these Safstep qualities, on your own lines. Then write for Catalog 4A28

IRVING IRON WORKS CO.

LONG ISLAND CITY. N.Y.. U.S.A.

Yards of brake chai

What the emergency brake must do!

NOT when the air pressure is O. K.! Not when the brake rigging is all tight. Not when the normal piston stroke of three or four inches sets the air brakes properly. Not when everything is pretty! These are not the times when the hand brake equipment matters.

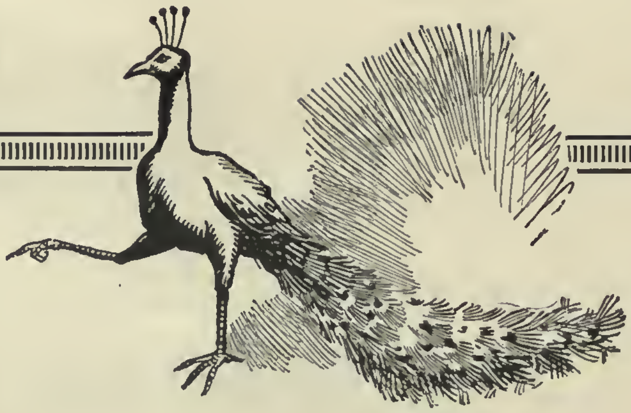
It's when the abnormal conditions arise. When the hand-brake must pull the piston through its entire stroke, and take up a couple of inches slack besides — than you need a hand brake, which will wind 30, 40, maybe 50 inches of chain by the time all the leverage is multiplied. Figure your own braking system yourself, under worst conditions, and see what this means.

Will your hand brakes meet this test?

Let us show
you about it
at our A.E.

NATIONA

to wind in!



PEACOCK STAFFLESS BRAKES

have ample capacity for any condition

THAT'S the big point in the hand-brake story. The only hand brakes "good enough" for any car, are those which possess this *capacity factor.*

Peacock Staffless Brakes have a chain-winding drum capable of taking up almost any amount of chain—over 100 inches if necessary. They will not jam or bind when these abnormal conditions occur. Peacock Staffless Brakes will stop the car.

. Convention Exhibit Space 543

RAKE COMPANY, Incorporated
890 Ellicott Sq., Buffalo, N. Y.
Canadian Representative:
Lyman Tube & Supply Company, Limited, Montreal, Canada

Jack Frost is "gettin' 'round"

preparing for his annual campaign against railway operation—particularly car heating.

How about you? Are you getting around too? Have you considered the advantages of the hot-air car heating system? Its operating cost, despite the increased cost of fuel, is about one-half that of the average electric heater installation. It is easier to install, simpler to operate, and relieves the power house of that heavy, extra peak load which is a cause of worry in so many properties.

Why not look into your heating system NOW? It pays to be prepared. Let us help with suggestions.

You will need heater parts also, to take care of replacements when the old heaters go into service again. Every day Jack Frost is getting nearer.

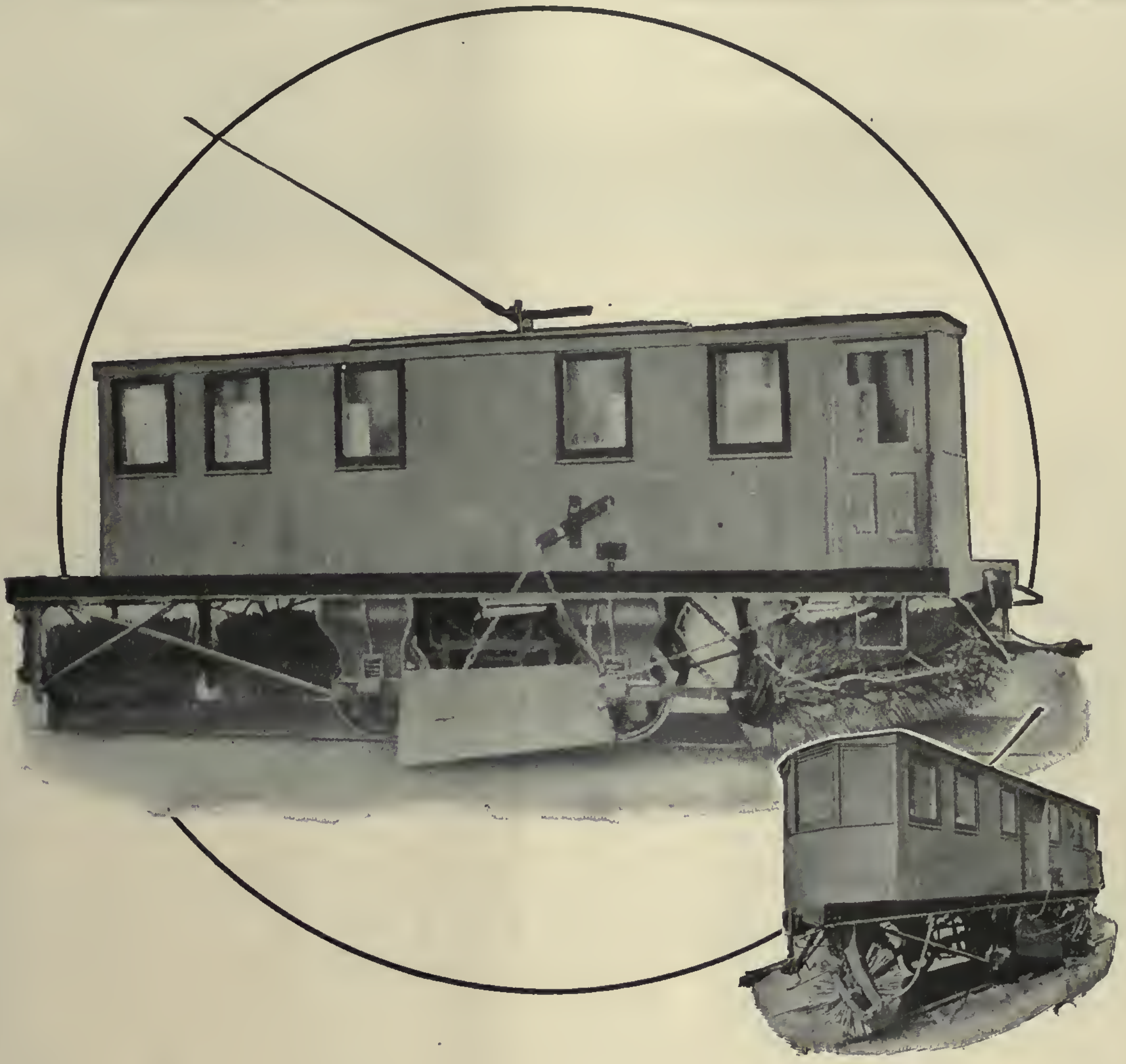
Peter Smith
Forced-Ventilation
Hot Air Car Heaters

We have just moved our factory from our old location on Mount Elliott Ave., to new and modern quarters at 6209 Hamilton Avenue, Detroit.

The PETER SMITH HEATER COMPANY
Detroit, Mich., and Walkerville, Ont.

PS HEATERS

SNOW!—its Removal



Efficient Snow-sweepers and McGuire-Cummings Mfg. Co. are names linked together in the mind of a majority of America's electric railway men. Fully 95% of all electric snow-sweeping equipment used in the United States and Canada is of McGuire-Cummings make.

The Standard single truck, steel underframe, long broom sweeper shown above is exceptionally strong and rigidly built, handling deep snow rapidly without stalling. The long broom clears both rails and fifteen inches additional on the outside of each track. Each broom is equipped with case-hardened roller bar steel belt chain, with detachable links.

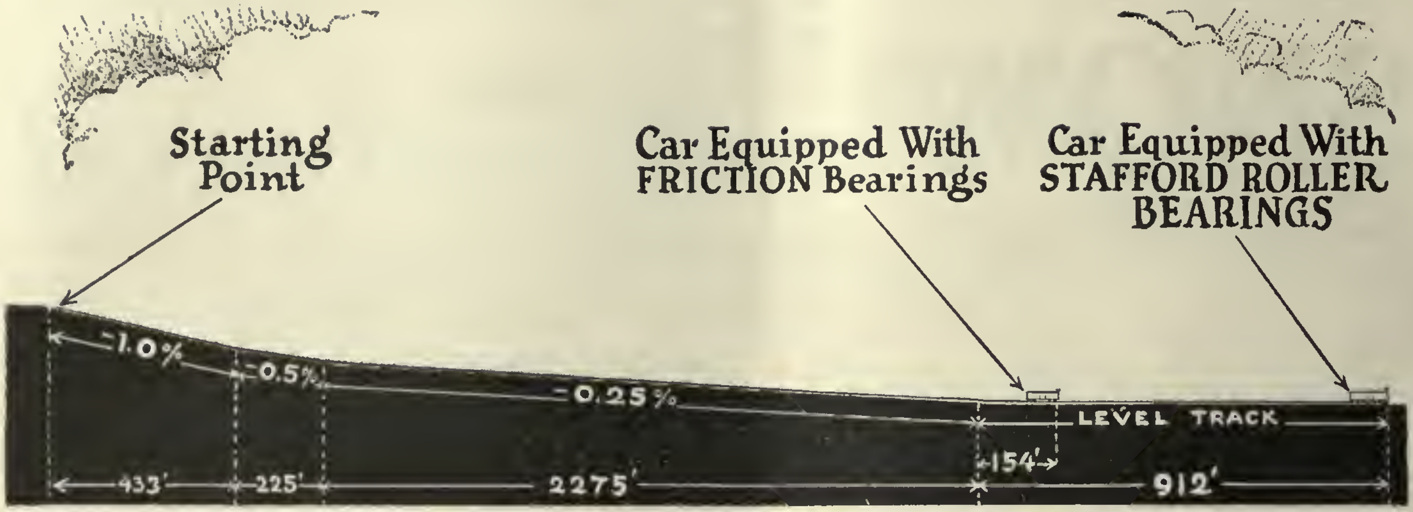
Over 1,400 of these long-broom sweepers are in use in all parts of the world where they have snow to contend with. Sweepers are also built in other types to cover every snow-fighting problem.

McGUIRE-CUMMINGS MFG. CO.

General Offices

111 W. Monroe Street, Chicago, Ill.

City and Interurban Cars and Trucks, Safety Cars, Combination and Work Cars,
Snow-Sweepers, Electric Locomotives.


Starting Point
Car Equipped With FRICTION Bearings
Car Equipped With STAFFORD ROLLER BEARINGS
-1.0%
-0.5%
-0.25%
LEVEL TRACK
433'
225'
2275'
154'
912'

Gives "Coasting" a New Significance

The distance a car will coast under its own momentum on level track depends very largely upon Journal Friction.

A car equipped with Stafford Roller Bearings coasts 6 times as far as a car equipped with Friction Journal Bearings. This was proven in tests made on the Michigan Central Railroad, the details of which are shown on the diagram.

One detail is not shown on the diagram. The Friction Bearing car would not start itself on the incline but had to be started by a locomotive. The Stafford equipped car at the same point and on the same incline started without a push.

Stafford Roller Bearings
guaranteed 3 years

Stop in at our Exhibit, space 104 and 106

STAFFORD ROLLER BEARING CAR TRUCK CORPORATION
LAWTON MICHIGAN
"IT ROLLS THE FRICTION AWAY"

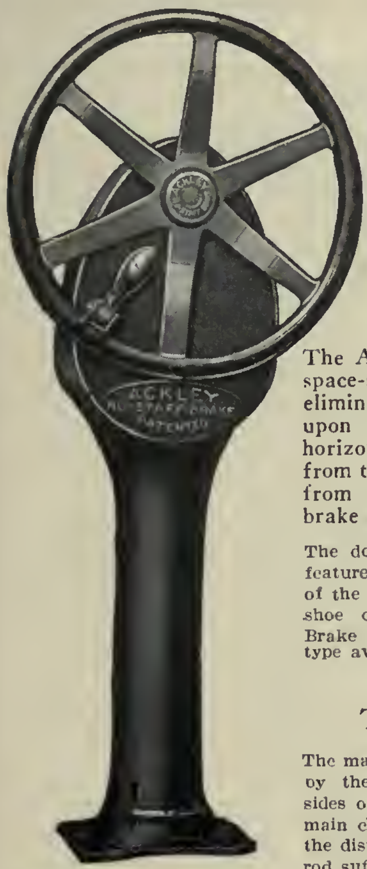
Do You Really Know the

ACKLEY BRAKES
Found The World Over

for example—

Do you know, that the Ackley No-Staff Brake is standard equipment in many countries and that its use here and abroad has been uniformly satisfactory?

Do you know that it is unequalled for speed and power, that it takes up minimum platform space, that no other brake can be so cheaply installed, that it costs no more than ordinary staff with gear brakes and their necessary accessories, that it is suitable for any size and weight of car?



**Ackley No-Staff Brake
Pressed Steel Type
Net weight 75 pounds
including chain and sheave**

These are facts and this tells why—

The Ackley No-Staff Brake combines the platform space-saving features of vertical wheel drive with elimination of the staff. The chain itself winds upon a double eccentric gear-driven drum, horizontally mounted in roller bearings, so is free from the evils of sprocket-cutting. The direct drive from drum to brake-shoe results in expeditious brake application with minimum effort.

The double eccentric drum provides a special regulator feature (see figures 1 and 2) in permitting the unwinding of the draw chain only to the extent necessary for brake-shoe clearance—thereby making the Ackley No-Staff Brake the most reliable brake mechanism of the staffless type available.

The Slack Adjustment Feature

The main chain (B) and the check chain (C) are attached by the same bolt to the drum, and lie on opposite sides of the drum. The check chain is attached to the main chain by a special link (D) at a point representing the distance of the minimum backward travel of the pull rod sufficient to give the necessary brake shoe clearance.

When the brakes are being applied, the main chain is taken up on one side of the drum simultaneously with the unwinding of the check chain from opposite side. Fig. 1 shows main chain wound once around drum and check chain unwound.

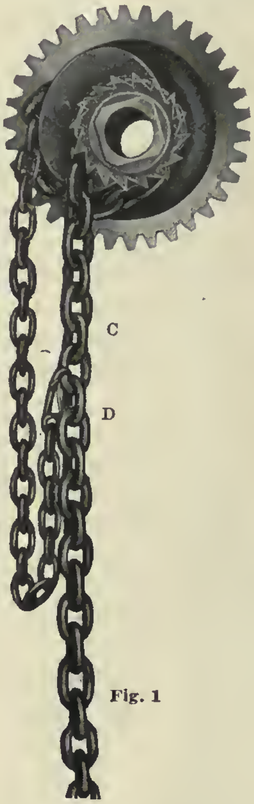


Fig. 1

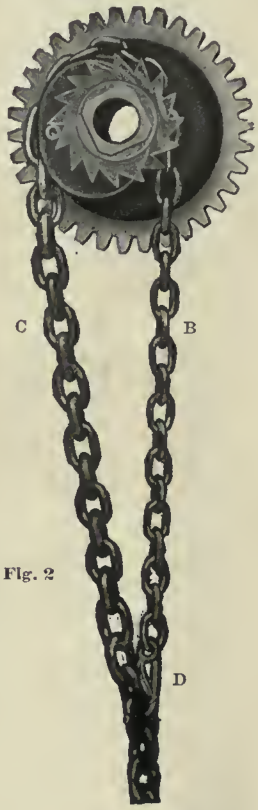


Fig. 2

When brakes are being released the main chain unwinds until stopped by the mounting check chain. Fig. 2 shows main chain unwound a distance limited by the check chain (corresponding to the travel of the pull rod) so that the slightest turn of the hand-wheel in the winding direction causes immediate advance of the brake shoes, all unnecessary winding having been eliminated. The special link of the check chain can be attached to any link of the main chain, so that slack can be adjusted at will.

INSTALLATON.—No other brake can be installed on the platform of a car as cheaply as the No-Staff. Cut a hole for chain and bolt brake in place.

GEAR RATIO—The brake is constructed for interchangeable gears. Four different ratios, 14x34, 12x36, 11x49, 10x38.

[Present Quotations
Specially Attractive]

Ackley Brake & Supply Corp.
50 Church Street, New York

DIAGRAMS

Fig. 3—Front Elevation
Fig. 4—Side Elevation
Fig. 5—Plan of Pedestal Base and Bracket

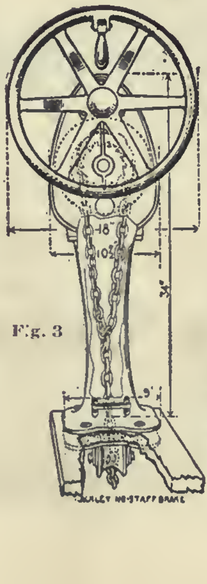


Fig. 3

Fig. 5

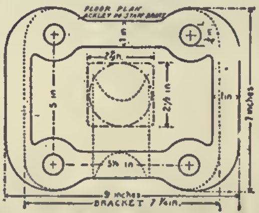
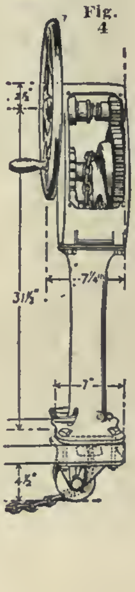


Fig. 4

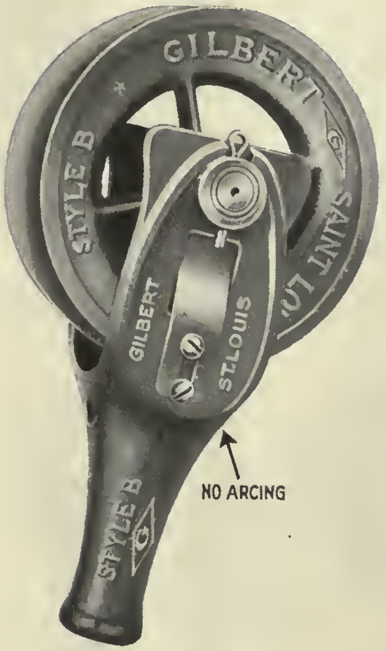


DIMENSIONS

WIDTH OF BASE	9 in.
BOLT HOLE CENTERS	5¼ in.
LENGTH OF BASE	7 in.
BOLT HOLE CENTERS	5 in.
WIDTH OF BRACKET	7¾ in.
LENGTH OF BRACKETS	7 in.
DIA. FLOOR CHAIN HOLE	2½ in.
DIA. " BOLT HOLES	¾ in.

More Miles Per Dollar

That Is What You Get When Your Order Calls for



our style B Wheel and Harp with 7/8 hollow pin for graphite grease.

Best service performance consistent with wear on overhead.

We make wheels to fit all standard harps.

Armature Bearings

made from our Velox Bronze and lined with our "C" grade Nickel Babbitt, mean—

SERVICE PLUS SATISFACTION
TO YOU

MORE BUSINESS FOR US.

LET'S GET TOGETHER

A. GILBERT & SONS BRASS FOUNDRY CO.

ST. LOUIS, U. S. A.

A. E. R. A.

Standard Patterns

BRAKE HEADS
BRAKE SHOES
BRAKE SHOE KEYS

Reinforced Diamond "S" Brake Shoe
BEST TYPE
SAFETY EFFICIENCY ECONOMY

Our Exhibit
At Booth 500

AMERICAN BRAKE SHOE & FOUNDRY COMPANY

30 Church St., New York
332 S. Michigan Ave., Chicago

PLANTS

Mahwah, N. J.
Buffalo, N. Y.
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Chicago, Ill.
Burnside, Ill.
Melrose Park, Ill.
Minneapolis, Minn.
St. Louis, Mo.
Chattanooga, Tenn.
Denver, Colo.
Houston, Texas
San Francisco, Calif.
Los Angeles, Calif.
Lancaster, N. Y.

90%
# of Your Gear Cases
RUB

You can eliminate many of the troubles caused by poor roadbed and track obstructions by using

Chillingworth Special Shallow Bottom Halves

("A Miss Is As Good As a Mile")

You can eliminate the opening up of joints experienced in service with riveted and welded cases by using

Chillingworth Jointless Construction

("In Unity There Is Strength")

You can greatly minimize expensive repairs experienced in service with Malleable Iron Gear Cases smashing against obstacles by using

Chillingworth Lightweight *Drawn Steel* Gear Cases

("An Ounce of Prevention Is Worth a Pound of Cure")

IT IS PROVERBIAL—that is to say, Universally Acknowledged—that the One Piece Construction is best adapted to protect your gears against dust and dirt and loss of grease, and cheaper to maintain, because it is made of Drawn Steel, which is tough and durable and readily repaired.

CHILLINGWORTH
Manufacturing Company, Jersey City, N. J.

REPRESENTATIVES:

H. F. Keegan Co., Chicago, Ill.
J. L. Whitaker, Boston, Mass.
Railway & Power Eng. Corp., Ltd., Canada
C. H. McCullough Eng. Corp., Pittsburgh, Pa.
Transit Equipment Co., New York, N. Y.
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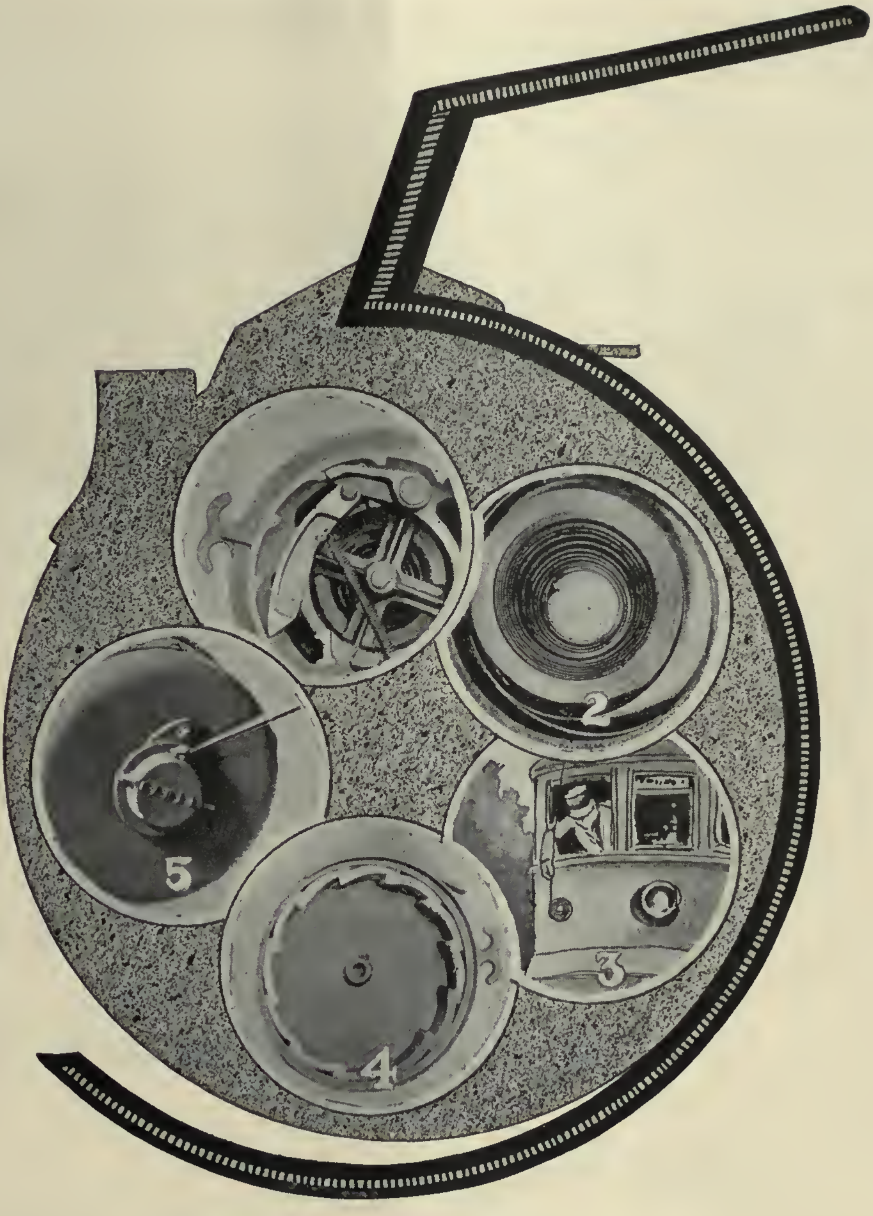


See the Big Five at the Convention

Five exclusive Earll Catcher and Retriever Features which have saved endless time, trouble and maintenance expense, while giving the utmost in efficient protection,

(1) No-wear Check Pawl.
(2) Free-winding Tension Spring.
(3) Ratchet Wind.
(4) Emergency Release.
(5) Perfect Automatic Lubrication.

Meet us at Booth 170. *We'll show you!*

C. I. EARLL, YORK, PA.

Canadian Representatives	*All Other Foreign Countries*
Railway & Power Engineering Corp'n. 133 Eastern Ave., Toronto	International General Electric Co.

EARLL CATCHERS & RETRIEVERS

PANTASOT

TRADE MARK

Standards for all Types o

Trolley Buses an

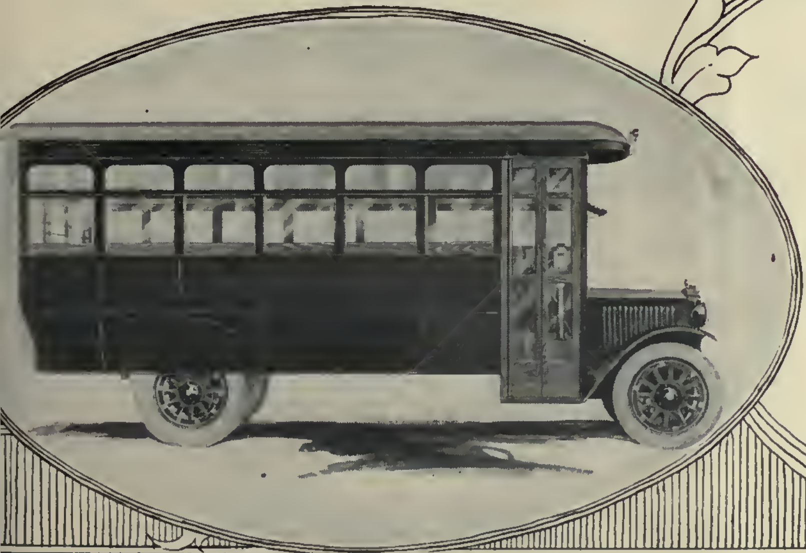
THE PANTA

Peoples Gas Building, Chicago *11 Bro*

AGASOTE
TRADE MARK

Electric Railway Cars ~

Motor Buses ~



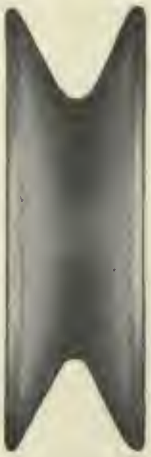
TE COMPANY

ork

Monadnock Bldg., San Francisco

BAYONET
Trolley Equipment

"U"



"V"

Bayonet Special Trolley Wheels

are made of the highest grade metal. No cheap alloys or old trolley wheels recast into new ones. All hand turned, insuring the greatest accuracy and balance. They are known the world over for their superiority, their economical and efficient service having been proven by competitive tests.

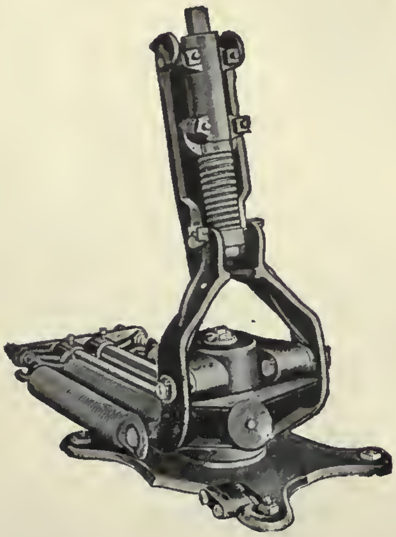
Bayonet Detachable Trolley Harps

are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in TEN SECONDS. No tools required on top of the car; only your hand is necessary. All inspections, repairs, adjustments and lubricating are done at the work bench where they are better done. This eliminates unsatisfactory patch-work on top of car, insures perfect running trolleys and increases your trolley wheel mileage at least 33⅓ per cent. The original and only practical Non-Arcing Harp made.

Bayonet Trolley Base With Detachable Pole Clamp

is the only trolley base made on which the trolley pole can be changed in 30 SECONDS and the wheel be in perfect alignment, with the wire, and no tools required to do the job. Greatest flexibility of pole action is afforded by long extension springs, and self-lubricated bushings in bearings, and the roller bearing swivel gives freedom to the rotary motion. It is so constructed that you get a uniform wire pressure at all angles of pole. All wearing parts are quickly and cheaply renewed, making the main parts of the base well-nigh everlasting.

Perfect conductivity is afforded by sliding contact between turret and base plate. It saves your overhead, your wheels and your wire by its freedom of action.

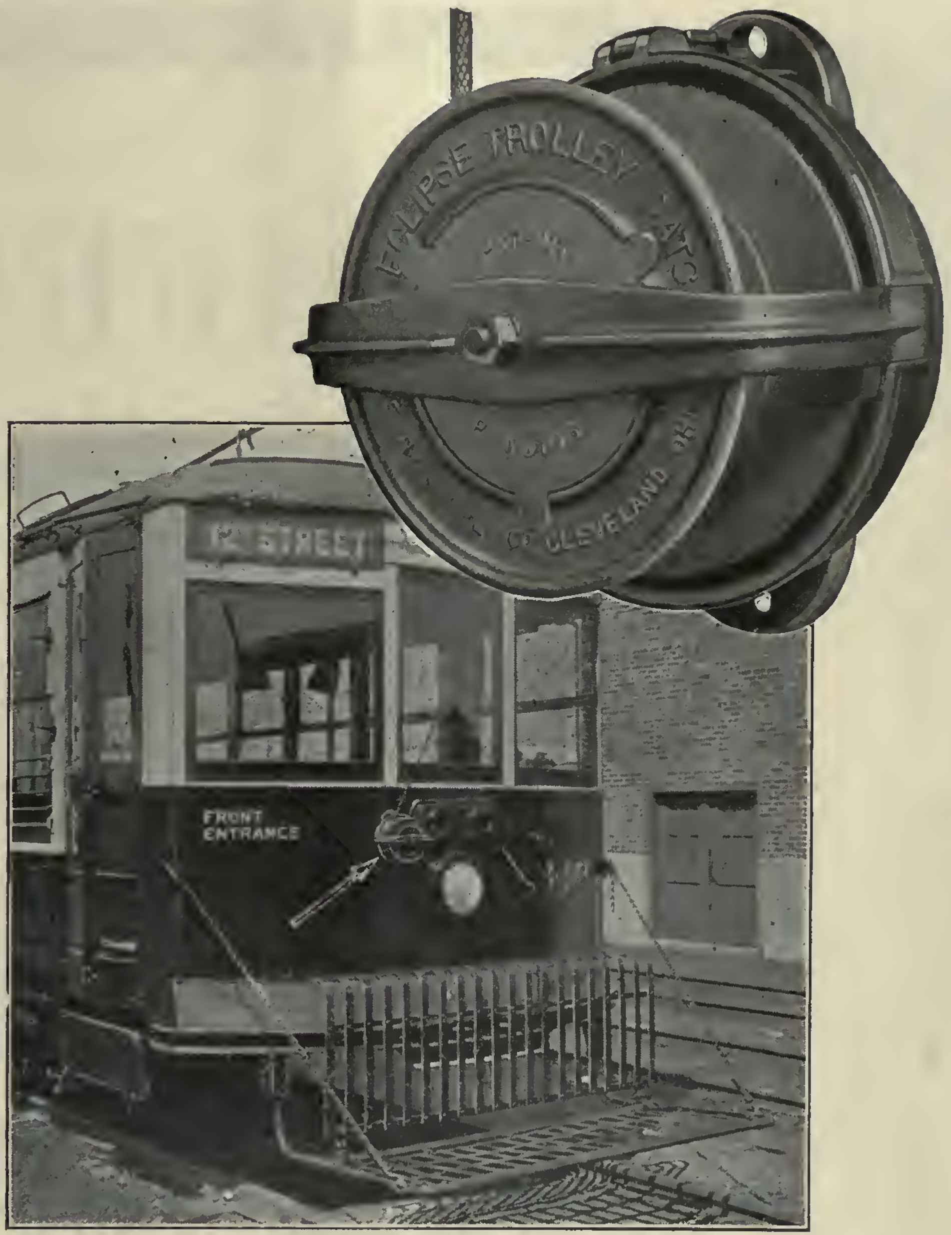


Bayonet Sleet Cutters

have no superiors in cutting ice from the wire. We make the rigid and semi-rotary types (the kind you can back up with) both of which are detachable and interchangeable with the wheel. Only ten seconds necessary to make the change from harp with wheel to one with sleet cutter.

All Bayonet equipment sold subject to approval. You must be satisfied or your money will be refunded.

Bayonet Trolley Harp Company
Springfield, Ohio



Eclipse Equipment

for safety on *all* type cars

Eclipse Fenders
Acme Type Fenders
Trolley Catchers
Trolley Retrievers
Eclipse Standard Wheelguard

Essentially simple and practical designs that have won favor with leading roads east and west. We have made a special study of fender requirements for train operation where quick coupling is essential.

Tell us your problems. We'll be glad to send samples and full specifications.

The Eclipse Railway Supply Co.
4824 Payne Ave. Cleveland, Ohio

GRIFFIN
F. C. S. Wheels

From the standpoint of both *Economy* and *Safety* the CHILLED IRON WHEEL is the ideal wheel for *all classes of service.*

LOW COST
MAXIMUM
MILEAGE

Facilities at each foundry for mounting wheels on axles

Griffin Wheel Company
McCormick Building, Chicago, Ill.

FOUNDRIES:

Chicago
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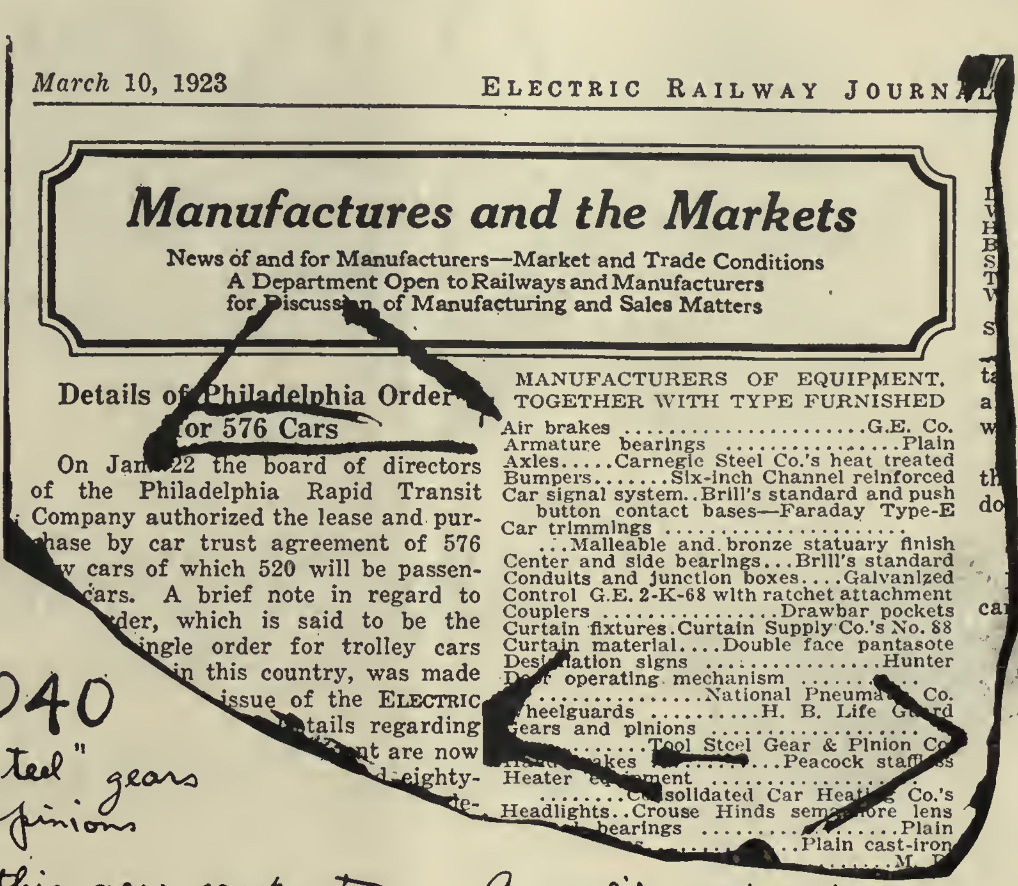
THE BIGGEST GEAR ORDER OF THE YEAR



March 10, 1923 ELECTRIC RAILWAY JOURN

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Details of Philadelphia Order for 576 Cars

On Jan 22 the board of directors
of the Philadelphia Rapid Transit
Company authorized the lease and pur-
hase by car trust agreement of 576
w cars of which 520 will be passen-
cars. A brief note in regard to
der, which is said to be the
ingle order for trolley cars
in this country, was made
issue of the ELECTRIC
tails regarding
nt are now
d eighty-
de-

MANUFACTURERS OF EQUIPMENT, TOGETHER WITH TYPE FURNISHED

Air brakes ......................G.E. Co.
Armature bearings ....Plain
Axles.....Carnegie Steel Co.'s heat treated
Bumpers.......Six-inch Channel reinforced
Car signal system..Brill's standard and push button contact bases—Faraday Type-E
Car trimmings ....Malleable and bronze statuary finish
Center and side bearings...Brill's standard
Conduits and junction boxes....Galvanized
Control G.E. 2-K-68 with ratchet attachment
Couplers ....Drawbar pockets
Curtain fixtures. Curtain Supply Co.'s No. 88
Curtain material....Double face pantasote
Designation signs ....Hunter
Door operating mechanism ....National Pneuma Co.
heelguards ....H. B. Life Guard
Gears and pinions ....Tool Steel Gear & Pinion Co
akes ....Peacock staff
Heater equipment ....Consolidated Car Heating Co.'s
Headlights..Crouse Hinds semaphore lens
bearings ....Plain
..Plain cast-iron
........M.

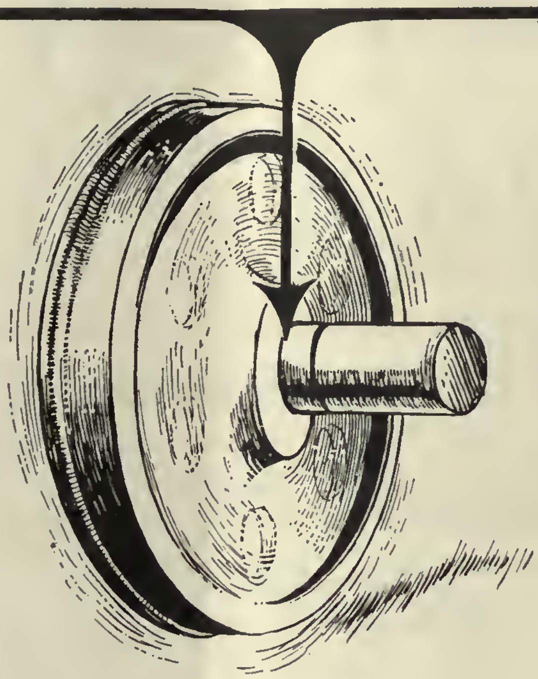
1040
"Tool Steel" gears
+ pinions
go on this new equipment.

a quality specification.

"Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

The Tool Steel
Gear and Pinion Co.
CINCINNATI, O.

This Shoulders the Burden—Bear it on Ajax Bearings



Ajax Car Brasses

Ajax Check Plates

Ajax Bull Bearing Alloy

Trade Mark

Ajax Quality Metals

The kind that last longer!

Heavy loads, high-speed service, and the strains of rapid acceleration and braking, these are the factors which Ajax Products are planned to meet. We have been making bearing metals and castings for over 40 years, and our policy now, as always, is—"The best is none too good."

Only the finest grades of raw materials enter into Ajax products and due to our experience and expert knowlege, correct alloys are secured to insure utmost durability under service conditions.

AJAX CAR BRASSES—leaders in their field for more than forty years. They are cast of finest quality metals, and turned with the accuracy and precision of a car wheel.

AJAX CHECK PLATES—made of our Perfecto Bronze, which will bend before it will break.

AJAX ARMATURE BABBITT is unsurpassed for adaptability and service.

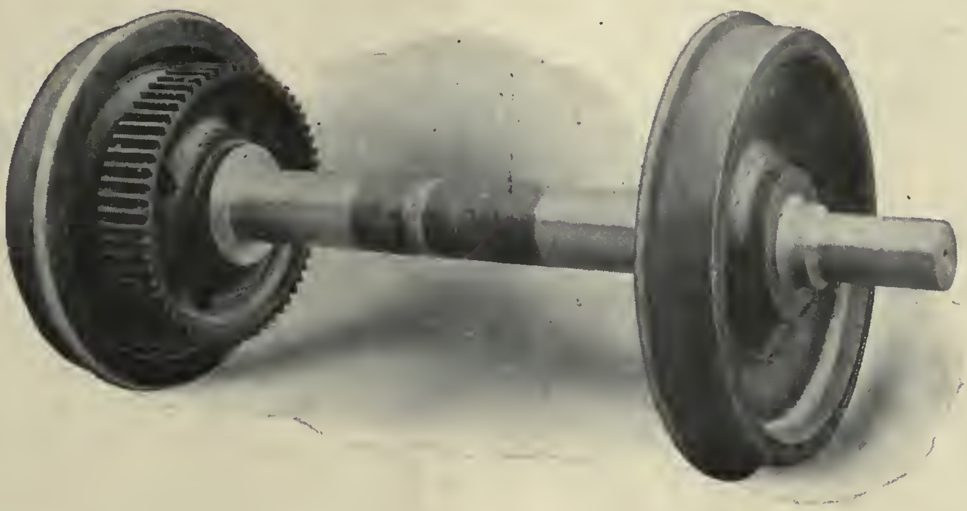
AJAX BULL BEARING ALLOY—a thoroughly dependable and economical lining for brasses and axle bearings. It lasts longer, runs cooler and costs less.

Specify Ajax products for new equipment and repairs.

The Ajax Metal Company
Established 1880
Philadelphia, Pa.
New York Chicago Boston Cleveland

'CARNEGIE' Products
for Electric Railway Service

'Carnegie' equipped means Efficient Service



'Wrought Steel' WHEELS

Recommended not only for their long and economical service, but for their assurance of Safety as well.

AXLES—

Ordinary Forged
Annealed
Quenched and Tempered

'Wrought Steel' GEAR BLANKS

Their process of manufacture insures a gear free from sand spots, blow holes and other irregularities—the proof is in the wearing.

Carnegie Steel Company

GENERAL OFFICES: CARNEGIE BUILDING, PITTSBURGH, PA.

You are cordially invited to visit Space 416 at the American Electric Railway Association's Convention, Atlantic City, October 8-12.

1650

Something to Look At!

Enjoy the wonderful view of the Atlantic, yes — but don't miss this exhibit which offers money-saving possibilities for your railway system.

The BOYERIZED LINE of Car Equipment

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
McArthur Turnbuckles
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

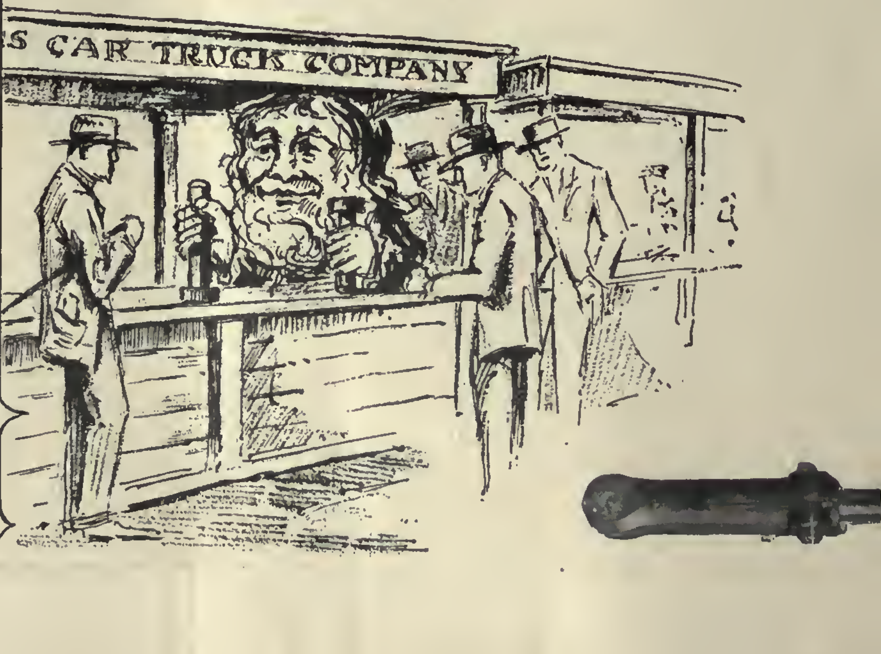
Rugged Resistanc

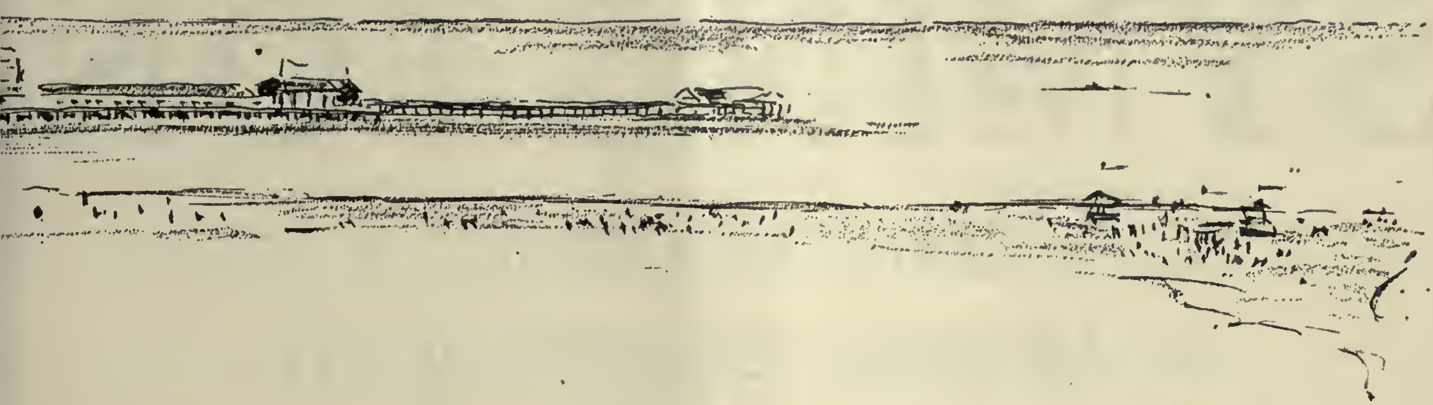
Like the Enduring Rocks

Ceaselessly, persistently, continuously, the never-quiet sea grinds and wears on rocks and sand along the shore. Anything soft is soon ground to dust. But nature has made these rocks and sand of sterner stuff. Even the tiniest grain of sand will last indefinitely.

So, too, in car equipment! Severe is the service which it must endure. It, too, must be made of sterner stuff. It must stand the constant wear, the abrasion of dirt and dust on rubbing surfaces, the attacks of moisture and alternate heating and cooling.

We demonstrate at
Booth No. 648





o Unceasing Wear

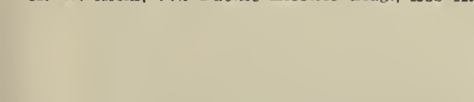
Equipment Which Lasts Longer

Boyerized equipment is setting new standards of long life and consequently of low cost in the railway field. The peculiar deeply-penetrating toughness imparted to steel by our special process gives these parts far longer life than ordinary untreated steel. The "Stuff" is in them.

At our Convention Exhibit on the Pier at Atlantic City, we will show you some actual samples taken from electric railway cars after wearing three or four times as long as any ordinary parts you ever tried. It will pay you to investigate this proposition.

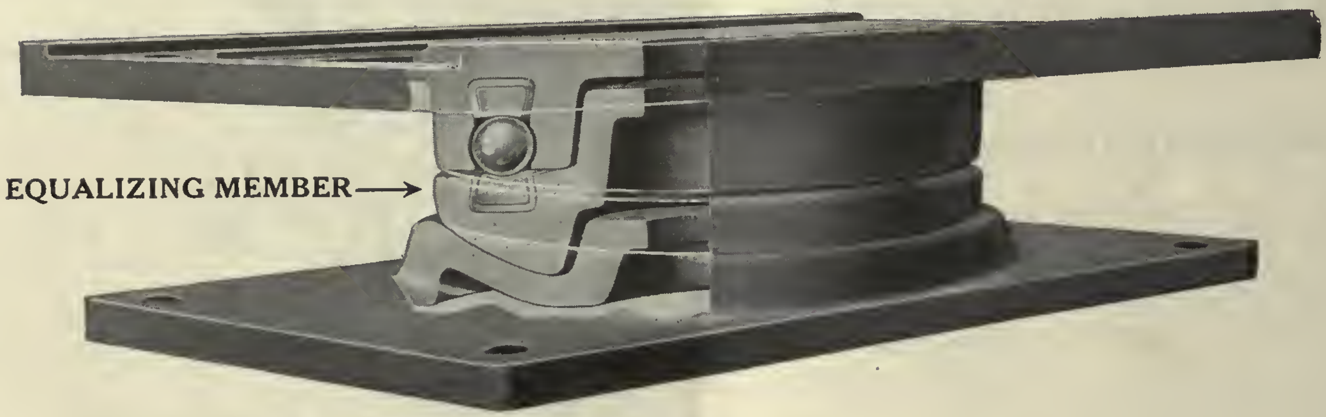
Bemis Car Truck Company
Electric Railway Supplies
Springfield, Mass.

Representatives:
Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.



SYMINGTON

BALL BEARING EQUALIZING CENTER PLATE



EQUALIZED—

that's why it's practical

BALL BEARING centerplates are money savers because of their low resistance to turning.

Sustained low turning resistance of Ball Bearings is maintained in the Symington Center Plate by use of an equalizing member.

Free to move in a limited arc, this member compensates for tilting of the bolsters in any direction and gives to each ball its proportion of the full load.

There is no possibility of concentrated loading and crushing of the balls or pocketing the race plates because the equalizing member insures equalized loading.

A practical application of ball bearings to center plates is assured in the Symington Equalizing Center Plate.

THE T. H. SYMINGTON COMPANY

New York Chicago Baltimore Boston Montreal
WORKS: ROCHESTER, N. Y.

STANDARD

"Not only to make better products but to make them better understood—not only to sell but to serve, assisting those who buy to choose as well as to use their purchases—this is the privilege if not the practice of all modern manufacturers." —*Vauclain*

STEEL WORKS COMPANY

ROLLED STEEL WHEELS
ARMATURE SHAFTS
MOTOR AXLES

**For use in
Electric Traction Service**

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES

CHICAGO
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PITTSBURG, PA.
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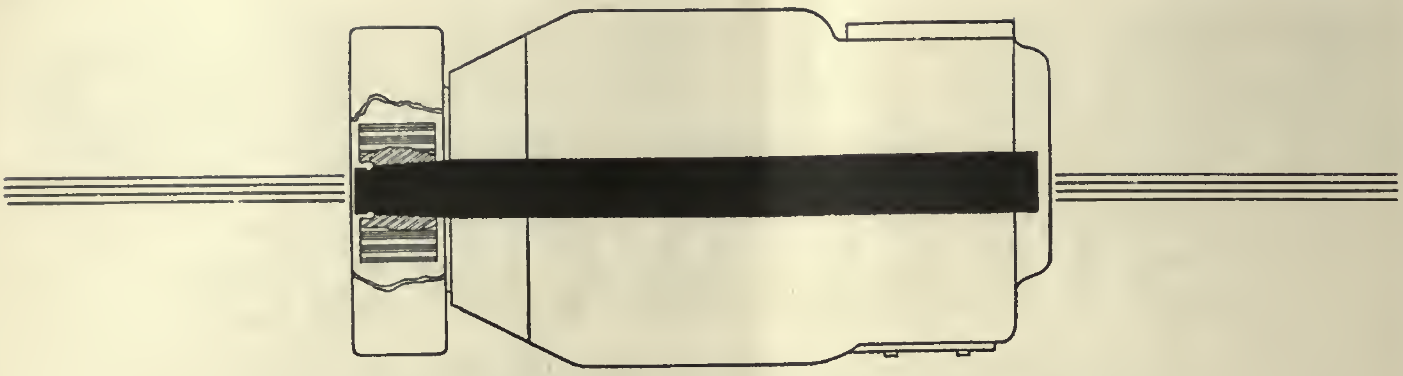

ARMATURE SHAFTS

Armature shafts are subject to alternating stresses incessantly repeated.

If there is any point of weakness, a fracture starts and slowly progresses until the shaft is no longer able to stand up. There is no economy, therefore, in purchasing "cheap" forgings. A shaft made of open hearth hammered steel by Standard Steel Works Company may be purchased with assurance of real economy.

"Not only to make better products but to make them better understood—not only to sell but to serve, assisting those who buy to choose as well as use their purchases—this is the privilege, if not the practice of all modern manufacturers."—Vauclain.

STANDARD STEEL WORKS COMPANY

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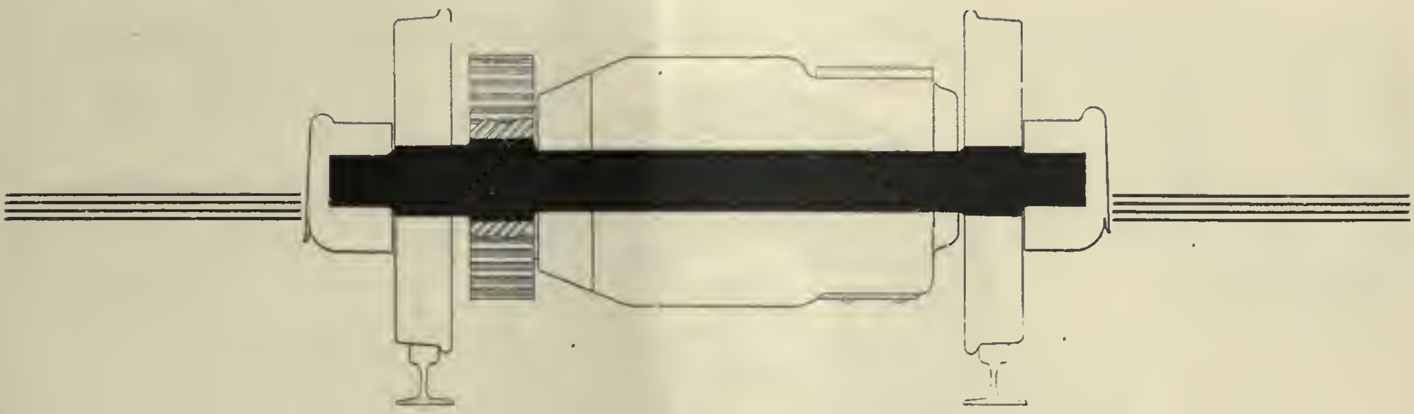

MOTOR AXLES

Full reliance can be placed in a Standard Steel Works Motor Axle. It is made from open hearth hammered steel and in no instance has its manufacture been hurried through in order to reduce production costs.

Any difference you may find in the cost of Standard Steel Works Forgings is a low price to pay for absolute dependability.

"Not only to make better products but to make them better understood—not only to sell but to serve, assisting those who buy to choose as well as use their purchases—this is the privilege, if not the practice of all modern manufacturers."—Vauclain.

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

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NEW YORK
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PITTSBURG, PA.
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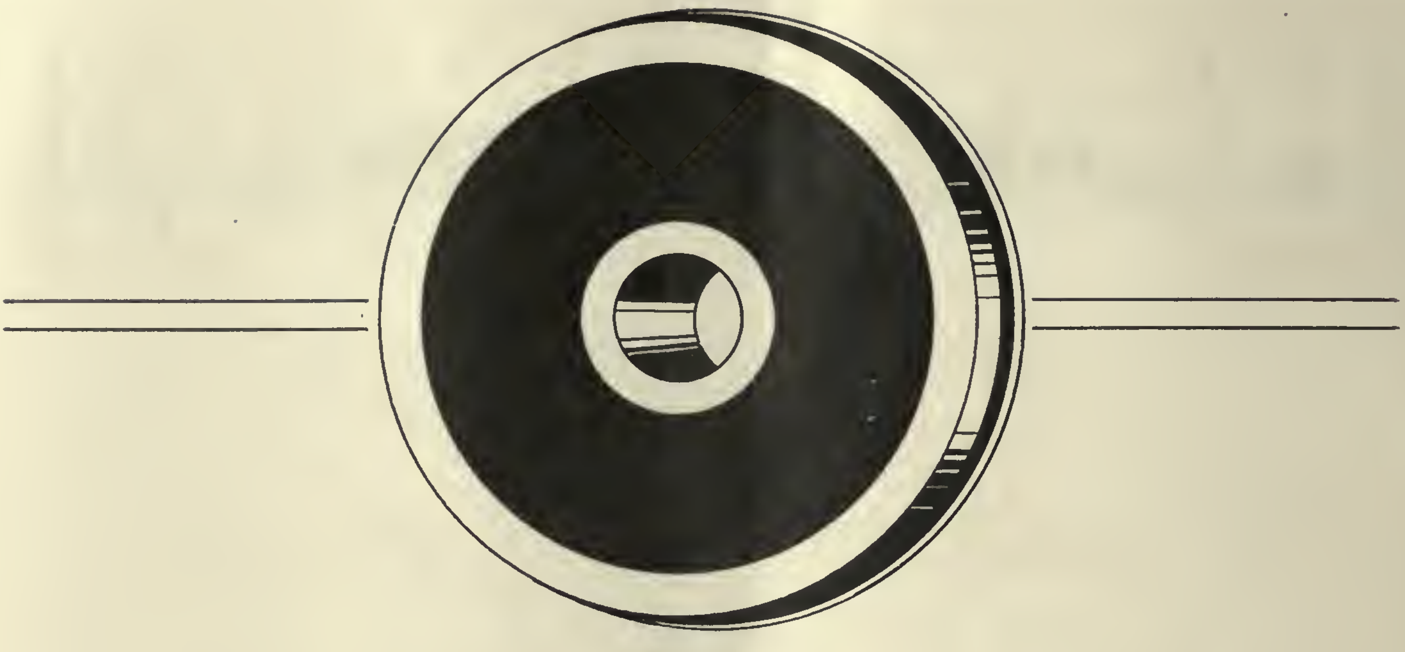
WORKS: BURNHAM, PA.



ROLLED STEEL WHEELS

Standard Steel Works Company produces driving and trailer wheels of the highest quality. We commenced the manufacture of rolled steel wheels in 1904. Our long experience is built into every wheel.

"Not only to make better products but to make them better understood—not only to sell but to serve, assisting those who buy to choose as well as use their purchases—this is the privilege, if not the practice of all modern manufacturers."—Vauclain.

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

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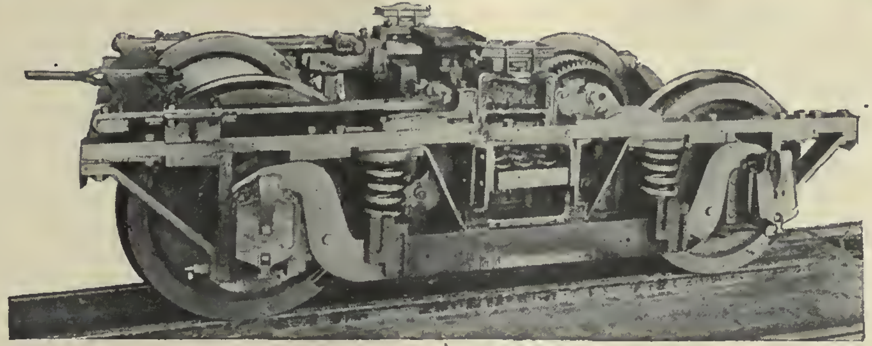
HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
NEW YORK
BOSTON
ST. PAUL, MINN.
PITTSBURG, PA.
MEXICO CITY, MEX

WORKS: BURNHAM, PA.

BALDWIN



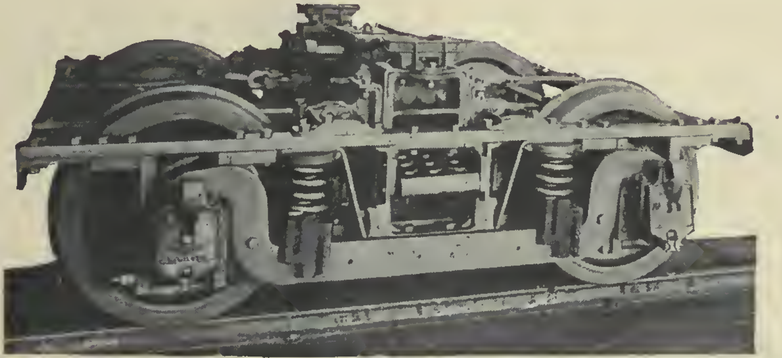
Motor Truck for Northwestern Elevated Railroad Company, Chicago

Baldwin Electric Trucks Are Locomotive-Built

THE upper illustration shows one of the 100 motor trucks for the Northwestern Elevated Railroad Co. of Chicago, and the lower illustration, one of 100 trailer trucks for the same road, built by these Works to the most exacting specifications, and with the same care and skill which have made the reputation of Baldwin locomotives world-wide.

This motor truck is used in high speed passenger service, and has a wheel-base of 78 inches, and a wheel-diameter of 34 inches. The wheel-base of the trailer truck is 66 inches, and the wheel diameter, 31 inches.

One motor and one trailer truck are used under each car. Weight of car body, light, 40,200 pounds, and weight of passenger load, approximately, 19,600 pounds.

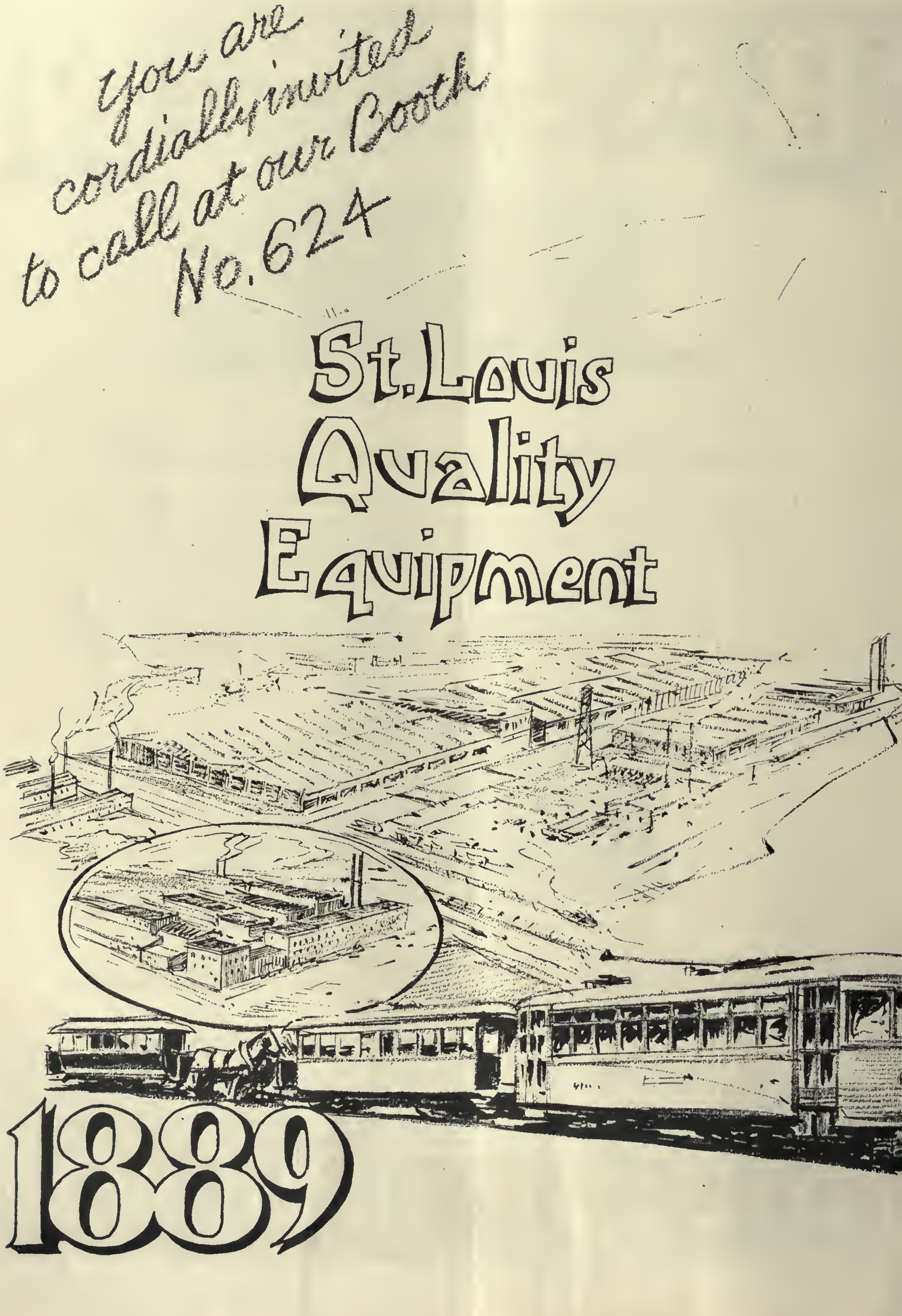


Trailer Truck for Northwestern Elevated Railroad Company, Chicago

At the exhibit in connection with the October Convention of the American Electric Railway Association, Spaces 148, 150 and 152, we will show a motor truck for the Indianapolis and Cincinnati Traction Co. This is a high-speed interurban truck with 84-inch wheel-base and a carrying capacity on the center-plate of 30,000 pounds. It is generally similar in construction to the motor truck shown above.

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

MOTOR TRUCKS


You are cordially invited to call at our Booth No. 624
St. Louis Quality Equipment
1889

Since the days when car "motors" lived in a stable

Cars with 34 years tradition behind them.

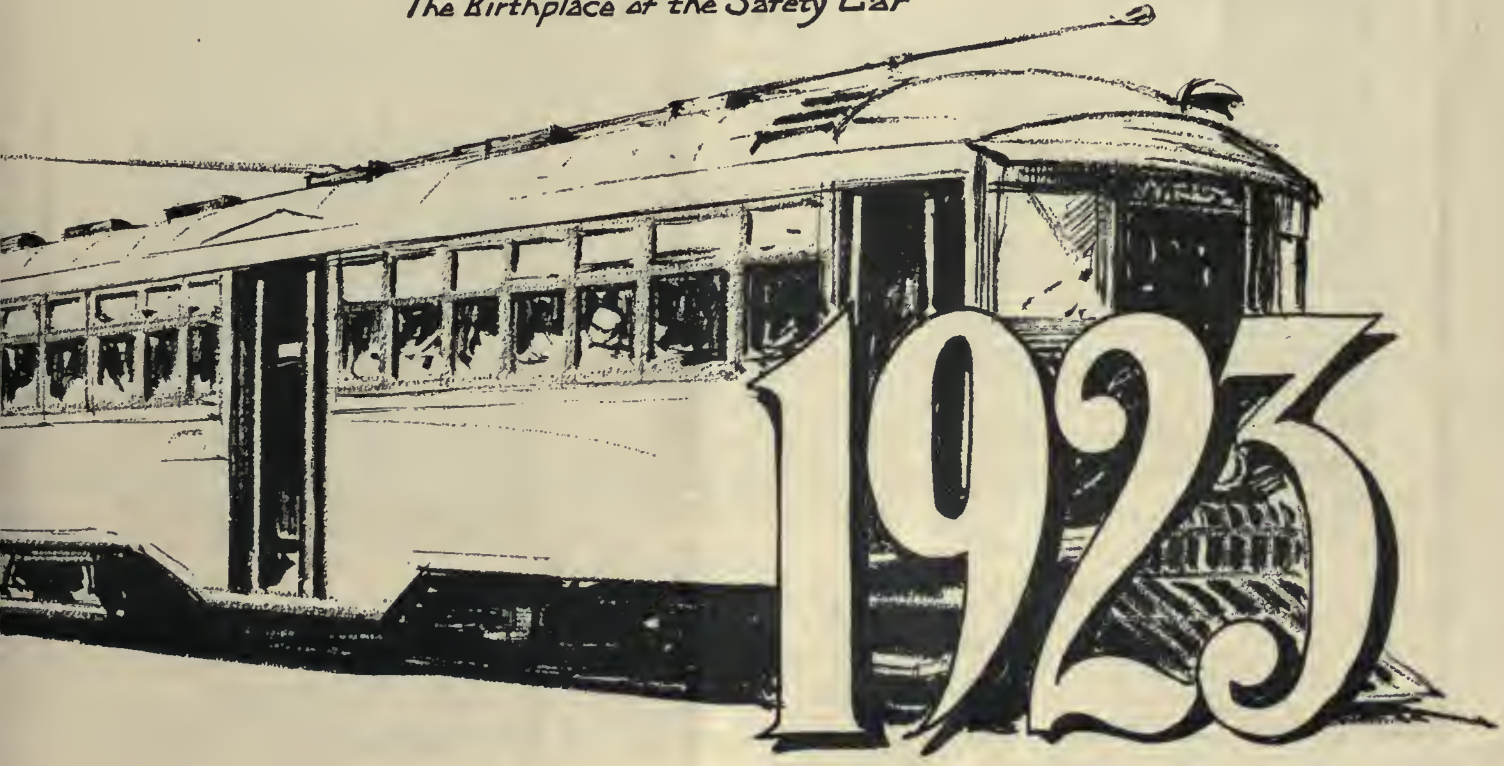
Only the veterans in the street railway game can remember now those distant days. Ask those same veterans who built the "Quality" cars of that time and they'll reply—"St. Louis Car Company."

Then, as now, our reputation for up-to-date approved design, and rigid adherence to quality standards, was known throughout the industry. Then, as now, our plant was the home of good workmanship.

The progressive policy of the St. Louis Car Company has resulted in many of the outstanding developments of electric railway transportation. For instance these shops mark the birthplace of the Safety Car, the "Universal" double-truck, one-man safety car, and other major features of the industry.

A.E.R.A. Convention Space 624

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"



The Director of Exhibits Says:

"Now lets go—full speed ahead for the finest Exhibit the Association has ever had."

WE'LL BE THERE

giving the Association and the Director our best efforts.

SPACE 631-633

The Cleveland Fare Box Co.

Cleveland, Ohio

Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

FARE BOXES
ZONE CHECK BOXES
CHANGE MAKING DEVICES

COIN COUNTING MACHINES
COIN SORTING MACHINES
COIN WRAPPERS

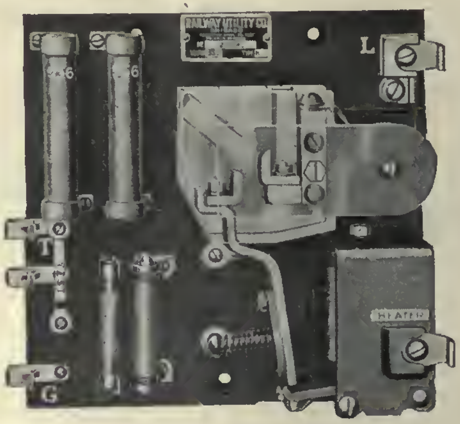
Utility New Type No. 8 Heat Regulator—

The Last Word in Thermostatic Control of Electric Heaters

The new method of mounting our Thermostats renders them absolutely shock and tamper-proof. Using a soft rubber bushing at the top of the mercury tube and holding the bushing in a loose-fitting clamp give it the flexibility necessary to prevent the separation of the mercury column ordinarily occasioned by vibration of the car or shock through tampering by the crews. We have also added a spring contact "S C" and a permanent contact "P," as shown in illustration. Should the mercury tube be broken from shock or vibration, the spring contact "S C" will engage permanent contact "P," thereby closing an electric circuit that cuts off the heat.

IN THE NEW NO. 8 SWITCH, shown in illustration at right, we have eliminated the use of a Relay and have substituted an Elminator, which takes the place of the Relay, so that the only movable part in the whole equipment is the main contactor, which cuts the heat in and out. We have also designed an Applicator, to take the place of Relays on any switches heretofore furnished by us, with complete instructions for making the change.

Give us a call at Booths 502 and 504, and we will explain all these new features, which will be of interest to you.



RAILWAY UTILITY COMPANY, Chicago

J. H. DENTON
1328 Broadway
New York

DETROIT RY. SUPPLY CO.
401 Equity Bldg.
Detroit

F. S. McNAMARA
307 Barth Bldg.
Denver

·Heywood-Wakefield·
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CAR SEATS

Rattan Car Seat Webbing
Snow Sweeper Rattan

HEYWOOD-WAKEFIELD car seats have great structural strength, compactness and comfort. Through their patented reversing features they are easy to operate. Their deep cushions and spring edges provide the utmost in passenger comfort. Covered in rattan, genuine or imitation leather. Rattan car seat webbing comes canvas lined or unlined in any width from 12 inches up to and including 48 inches.

Buy your *snow sweeper rattan* now and avoid delay at critical moments later. Ever since rattan has been used in snow sweepers the Heywood-Wakefield Company has supplied it in natural and cut lengths. Purchasers today think of Heywood-Wakefield when they think of rattan, because they know we can supply them with exactly what they want and need.

Write or phone to our nearest office for prices and illustrations.

HEYWOOD-WAKEFIELD COMPANY
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Sales Offices:

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E. F. Boyle, Monadnock Bldg., San Francisco, Cal.
F. N. Grigg, 630 Louisiana Ave., Washington, D. C.
Railway & Power Eng'r'g Corp., Toronto and Montreal
G. F. Cotter Supply Co., Houston, Texas

·Heywood-Wakefield·
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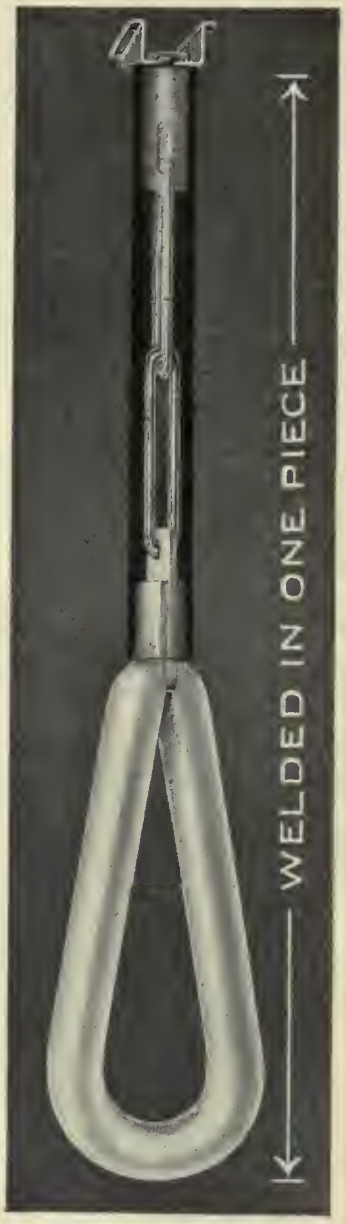


NATIONAL
Light
Metal
HANDLES

Strong
Sanitary
Comfortable
Economical

Replace leather straps

Practically indestructible, National Light Metal Handles last indefinitely. Their slightly higher first cost is saved many times over when you count the expense of maintaining leather straps.

And the added value of cleanliness and attractive appearance is a valuable aid to the railroad company which is really trying to improve and sell its service.

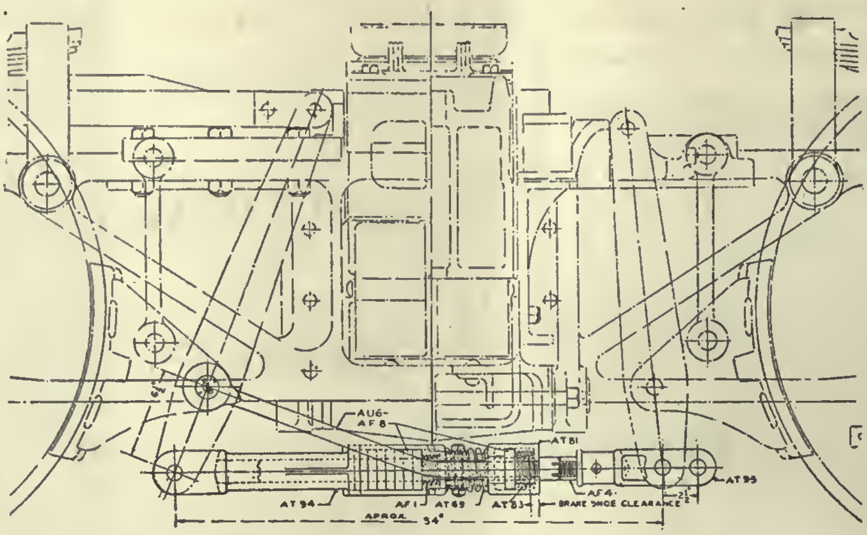
National Light Weight Handles are comfort making and public pleasing.

Standard on over 50 electric railway lines of passenger cars.

Let us figure on equipping your cars.

Central Equipment Co.
800 Englewood Ave.
Buffalo, New York

Representatives
National Railway Appliance Co., New York
Grayson Railway Supply, St. Louis
Hageman-Castle Corp., Chicago



GOULD AUTOMATIC SLACK ADJUSTER

Give 100% Brake Efficiency.
Gould Adjusters are made to fit any truck in place of turnbuckles.
Makes your car fit to run and remain in service.
Gould Universal Slack Adjusters are becoming standard on the leading railways of this country.

Type C illustrated.

Gould engineers are pioneers in the world of *brakes, slack adjusters* and *automatic safety appliances.*

Get our figures for your new cars. We manufacture adjusters to fit any style of truck or brake rigging.

GOULD COUPLER COMPANY

30 East 42nd St., New York City **Works: Depew, N. Y.** **The Rookery, Chicago, Ill.**

Lighten Your Cars with Van Dorn

No. 930 Light-weight Radial M.C.B. Couplers

See this Coupler at Space No. 404, Annex

This equipment weighs considerably less than most other M. C. B. Couplers. Our special design has made possible this light weight without sacrifice of strength.

The construction is such that it is practically one rigid casting from coupler face to anchor pin.

The spring draft gear of over 21,000 pounds capacity is capable of handling any interurban service of the present day.

The contour of Van Dorn No. 930 is of standard A. R. A. specifications (contour No. 10) and will not bind in handling train of cars over abrupt changes in grade.

The Coupler has a lock-set position, making possible one-man switching.

The No 930 will intercouple with any other standard M. C. B. type. It is now in use on many important properties.

VAN DORN COUPLER COMPANY

2325 South Paulina Street, Chicago, Ill.

There's a dollar sign back of

Le Carbone Carbon Brushes

and its on your side of the ledger

They speak for themselves

W. J. JEANDRON, 229 Fulton St., New York, N. Y.

Pittsburgh: W. P. Boynton, Mgr. San Francisco: W. R. Catching, Mgr.

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More Miles Per Dollar with THORNTON

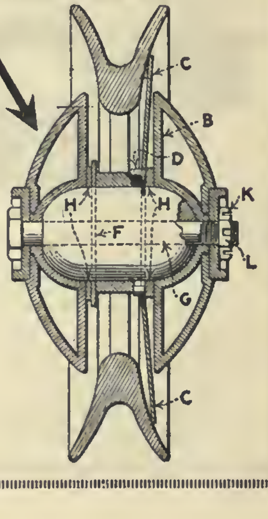
Side Bearing Trolley Wheels

By reducing their repair bills and road delays to a minimum and entirely eliminating their lubrication troubles, the new Thornton Side Bearing Trolley Wheel has won the approval of many roads throughout the country.

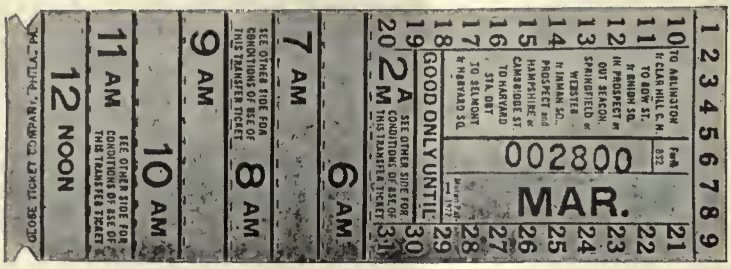
The secret is in the bearings

There's no vibration with the Thornton Bearing even after it has given 75,000 miles of service. And absence of vibration means longer wear for the trolley wheel and harp. It means also freedom from arcing troubles—pitted wire, burnt out lamps, etc.

Furthermore the ample oil reservoirs hold a one to four-week's supply—no other attention whatsoever is required. With Thornton Bearings the operator gets every mile of mileage that's built into any trolley wheels used with them. They have been known to outlast twelve wheels. That's rockbottom economy! *Get the bulletin now!*



Thornton Trolley Wheel Co.
Ashland, Kentucky



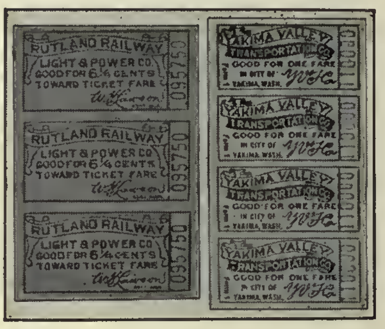
When You Think Tickets—
Think GLOBE

This means Tickets to sell in Strips, or in books, as well as Cash Fare Receipts, Weekly Passes, and Transfers of various kinds.

All of these various kinds of Globe Products have their particular places in the largest and most modern Electric Railway Systems in the Country.

If you have a Ticket Idea and want Tickets, or if you want an Idea—let us know! We can help you.

GLOBE TICKET COMPANY
116 N. 12th Street, Philadelphia, Pa.
Los Angeles New York San Francisco



RUTLAND RAILWAY LIGHT & POWER CO.
GOOD FOR 6¼ CENTS TOWARD TICKET FARE
YAKIMA VALLEY TRANSPORTATION CO.
GOOD FOR ONE FARE

Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its ENDURANCE and ECONOMY.

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED

No. 478E

GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

N-L VENTILATORS
for Electric Railways and Motor Buses.
Unexcelled for ventilation and appearance.
Write for new catalogue

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A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

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KASS SAFETY TREADS
HIGH
in efficiency and lasting qualities
LOW
in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago

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If you desire an agency or sales connection, use these columns.

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0129

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is the only type of non-metallic flexible conduit absolutely preventing penetration of grease and oil to the electric wires within, due to its member of cotton duck heavily sized with glue, and the asphaltum impregnation and finish gives positive waterproofing.

ALPHADUCT COMPANY
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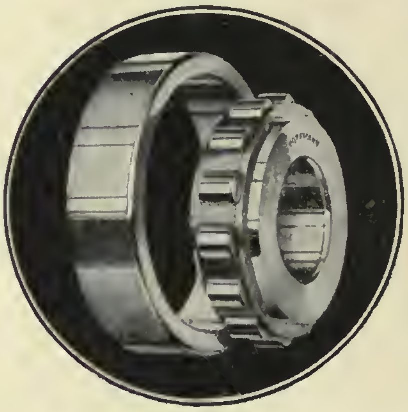
DELEGATES

At Florida Avenue and the Board Walk you will find a car fully equipped demonstrating automatic whistle and automatic bell-ringing for the prevention of accidents.—It will be worth your while to look this car over.

NATIONAL SAFETY DEVICES COMPANY
Waterloo, Iowa

HOFFMANN

PRECISION ROLLER BEARINGS



For Heavy Loads and Hard Service; Standard and Self-Aligning Types

Heavy-duty units built to the highest standards of precision; affording maximum serviceability under conditions involving heavy loads, temporary overloads, shocks, jars and vibrations; offering new opportunities for power saving and reduced upkeep costs.

Our engineers will welcome an opportunity to work with yours, in the application of these high-duty, high-precision bearings to electric railway machinery, with a view to securing maximum anti-friction efficiency, minimum maintenance costs, and continuity of service.

THE NORMA COMPANY OF AMERICA
Anable Avenue
Long Island City New York
MAKERS OF "NORMA" PRECISION BALL BEARINGS

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Circuit Breakers
Roller-Smith Co.

Air Pressure Relays
Elec. Development & Mach. Co.

Air Receivers, Aftercoolers
Ingersoll-Rand Co.

Air Rectifiers
Economy Elec. Devices Co.
National Safety Devices Co.

Ammeters
Roller-Smith Co.

Anchors, Guy
Drew Elec. & Mfg. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Standard Steel Works Co.
Western Elec. Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Standard Steel Works Co.
Taylor Elec. Truck Co.

Axles, Car Wheel
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Westinghouse E. & M. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Babbitt Metal
Ajax Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
Internat'l Register Co., The

Barges, Steel
American Bridge Co.

Batteries, Dry
National Carbon Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
General Electric Co.
Gilbert & Sons, B. F. A.
More-Jones Brass & Metal Co.
Taylor Elec. Truck Co.
Westinghouse E. & M. Co.

Bearings Center and Roller Side
Baldwin Locomotive Wks.
Stucki Co., A.

Bearings, Roller
Norma Co. of America

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car-Heating Co.
Elec. Service Supplies Co.
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Bodies, Bus
Eckland Bros.

Boilers
Babcock & Wilcox Co.
Edge Moor Iron Co.

Boiler Tubes
Edge Moor Iron Co.
National Tube Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co.
Indianapolis Switch & Frog Co.
Ohio Brass Co.
Railway Track-work Co.
Western Elec. Co.

Bonds, Rail
American Steel & Wire Co.
Drew Elec. & Mfg. Co.
Elec. Service Supplies Co.
General Electric Co.
Indianapolis Switch & Frog Co.
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Book Publishers
McGraw-Hill Book Co.

Bond Testers
Roller-Smith Co.

Boxes, Switches
Johns-Pratt Co.

Brackets and Cross Arms (See also Poles, Ties Posts, etc.)
Bates Exp. Steel & Tr. Co.
Drew Elec. & Mfg. Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Western Elec. Co.

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Gould Coupler Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Taylor Elec. Truck Co.

Brakes, Brake Systems and Brake Parts
Ackley Brake & Supply Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
National Safety Devices Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brooms, Track, Steel, Rattan
Paxson Co., J. W.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Stackpole Carbon Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.
National Carbon Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
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Brushes, Wire Pneumatic
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American Bridge Co.

Bus Bars Insulators
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Buses, Motor
Brill Co., The J. G.
International Motor Co.
Philadelphia Motor Coach Co.
White Co., The

Bushings
National Vulcanized Fibre Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

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Cambric, Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.
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Carbon Brushes (See Brushes Carbon)

Car Lighting Fixtures
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Car Panel Safety Switches
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Cars, Dump
Differential Steel Car Co.
St. Louis Car Co.

Cars, Passenger, Freight Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Thomas Car Wks., P. A.
Wason Mfg. Co.

Car Trucks, Roller Bearing
Stafford Rollers Bearing Car Truck Corp.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
General Electric Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
More-Jones Brass & Metal Co.

Castings, Electric Steel
Fort Pitt Steel Castings Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Wks. Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.

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Earll, C. I.
Eclipse Ry. Supply Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.
Western Elec. Co.

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Pantasote Co.

Ceiling, Plywood, Panels
Haskelite Mfg. Corp.

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Cleveland Fare Box Co.

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General Electric Co.
Roller-Smith Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
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Brill Co., The J. G.
Ohio Brass Co.

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Elec. Development & Mach. Co.

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Coils, Choke and Kicking
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Cleveland Fare Box Co.
Elec. Service Supplies Co.
Internat'l Register Co., The
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

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Cleveland Fare Box Co

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Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.

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Allis-Chalmers Mfg. Co.
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Ingersoll-Rand Co.
Western Elec. Co.
Westinghouse Tr. Br. Co.

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Elec. Service Supplies Co.
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Crossing Foundations
International Steel Tie Co.

Crossing Frog and Switch
Ramapo Ajax Corp.
Wharton, Jr., & Co., Wm.

Crossing, Manganese
Bethlehem Steel Co.
Indianapolis Switch & Frog Co.
Ramapo Ajax Corp.

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Crossings, Trolley
Ohio Brass Co.

Crushers, Rock
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Consolidated Car-Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

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Elec. Development & Mach. Co.

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Edwards Co., O. M.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.

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Nat'l Pneumatic Co., Inc.

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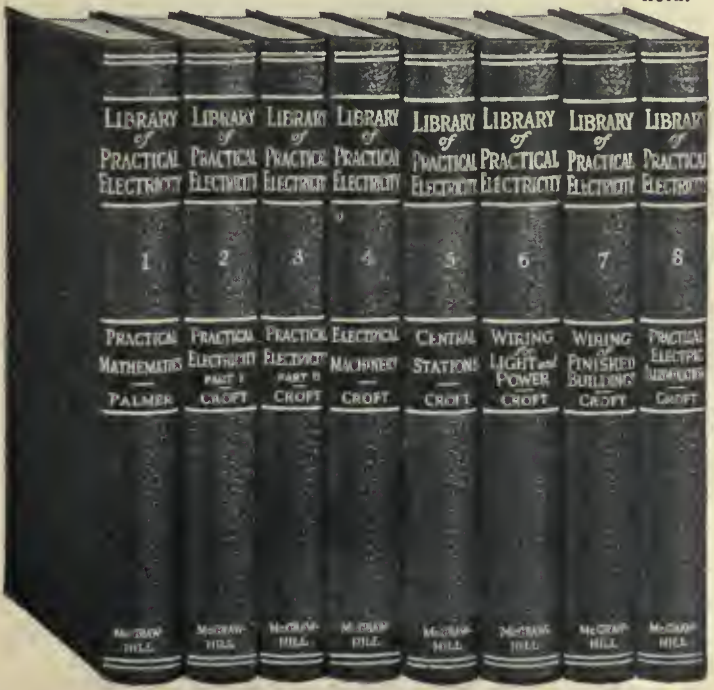
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Bates Exp. Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.
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International Creosoting and Construction Co.

Poles, Ties, Post, Piling and Lumber
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Bell Lumber Co.
International Creosoting and Construction Co.

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Lapp Insulator Co.

Potheads
Okonite Co.

Potheads, Cable
Elec. Development & Mach. Co.

Power Saving Devices
Economy Elec. Devices Co.
National Ry. Appliance Co.

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Bonney-Vehslage Tool Co.
International Reg. Co., The
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Rail Braces and Fastenings
Ramapo Ajax Corp.

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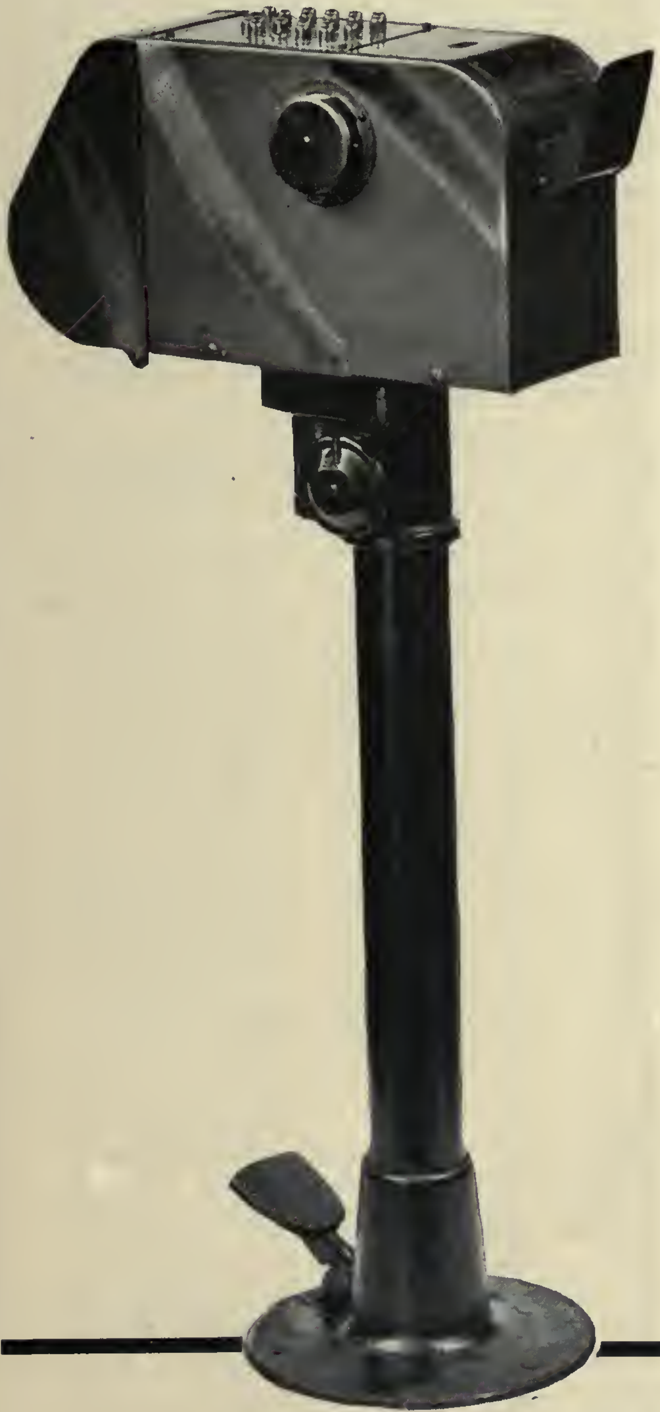
Carnegie Steel Co.
Rail Joint Co.

Providence has 135

SHANKLIN

Transfer Machines



The United Electric Railways Co. installed Shanklin Transfer Machines on all its new one-man cars after being convinced that the Shanklin idea would hurry the line of passengers past the cash box.

You know from daily experience on your own lines, that cars are seriously delayed at white poles just because passengers who want transfers have got to wait for the over burdened conductor to get out his pad and punch out the transfer points and time. It's bad enough if everyone is transfering to the same line but it's exasperating, both to conductor and passengers, when one wants one transfer point, the next another and so on.

With a Shanklin Transfer Machine on the platform alongside the conductor or operator this problem will be simplified to the utmost.

The conductor presses one button which punches the transfer point and intersecting line. A foot pedal automatically punches the month, date, hour, etc., and delivers the transfer all cut to the passenger while the conductor is taking the fare of the next in line.

But there is more than a saving in time. In Springfield, Mass., where Shanklin Transfer Machines have been used for two years on both large prepayment cars and safeties a saving of 40% over pad transfers has been made. There are no wasted transfers as no transfer is punched until it's wanted.

The machine accommodates 500 to 1000 transfers, weighs 21 lbs., and is easily shifted from platform to platform.

Submit us one of your transfers and let us demonstrate how the Shanklin System can save time and money for your company.

SHANKLIN EQUIPMENT CO.
Besse System Bldg., Springfield, Mass.

Rail Joints, Welded
Indianapolis Switch & Frog Co.
Metal & Thermit Corp.

Rails, Steel
Carnegie Steel Co.

Railway Paving Guards, Steel
Godwin Co., Inc., W. S.

Railway Transfer Printing
Shanklin Equipment Co.

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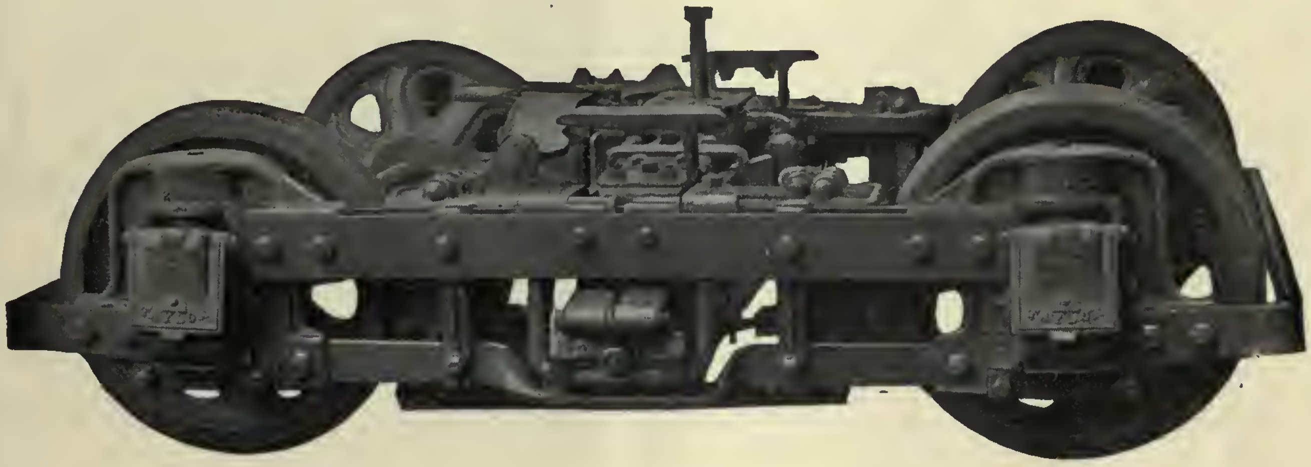

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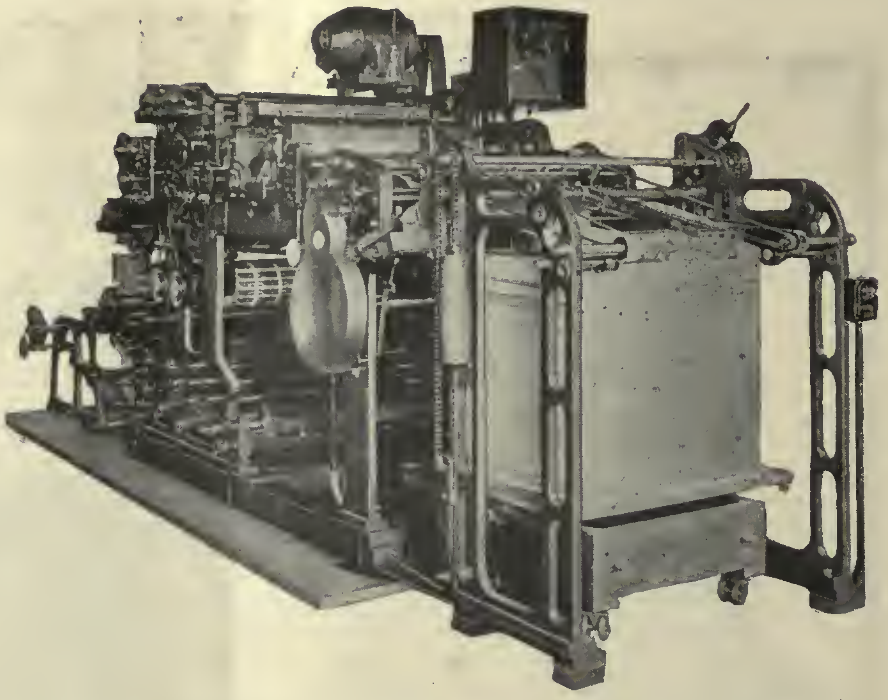

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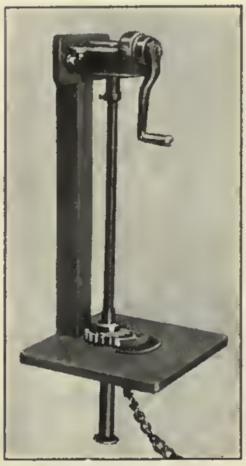

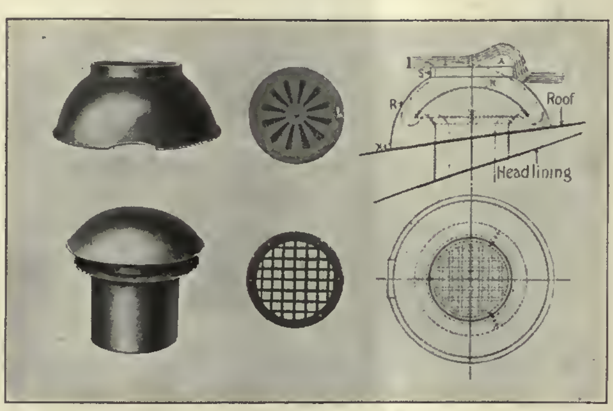

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A careful investigation of the Brill "Rail-less" car and its operation divulges the fact that electric railway personnel is well acquainted with its equipment and its ability to furnish real co-ordinated transportation in conjunction with their present railway equipment.

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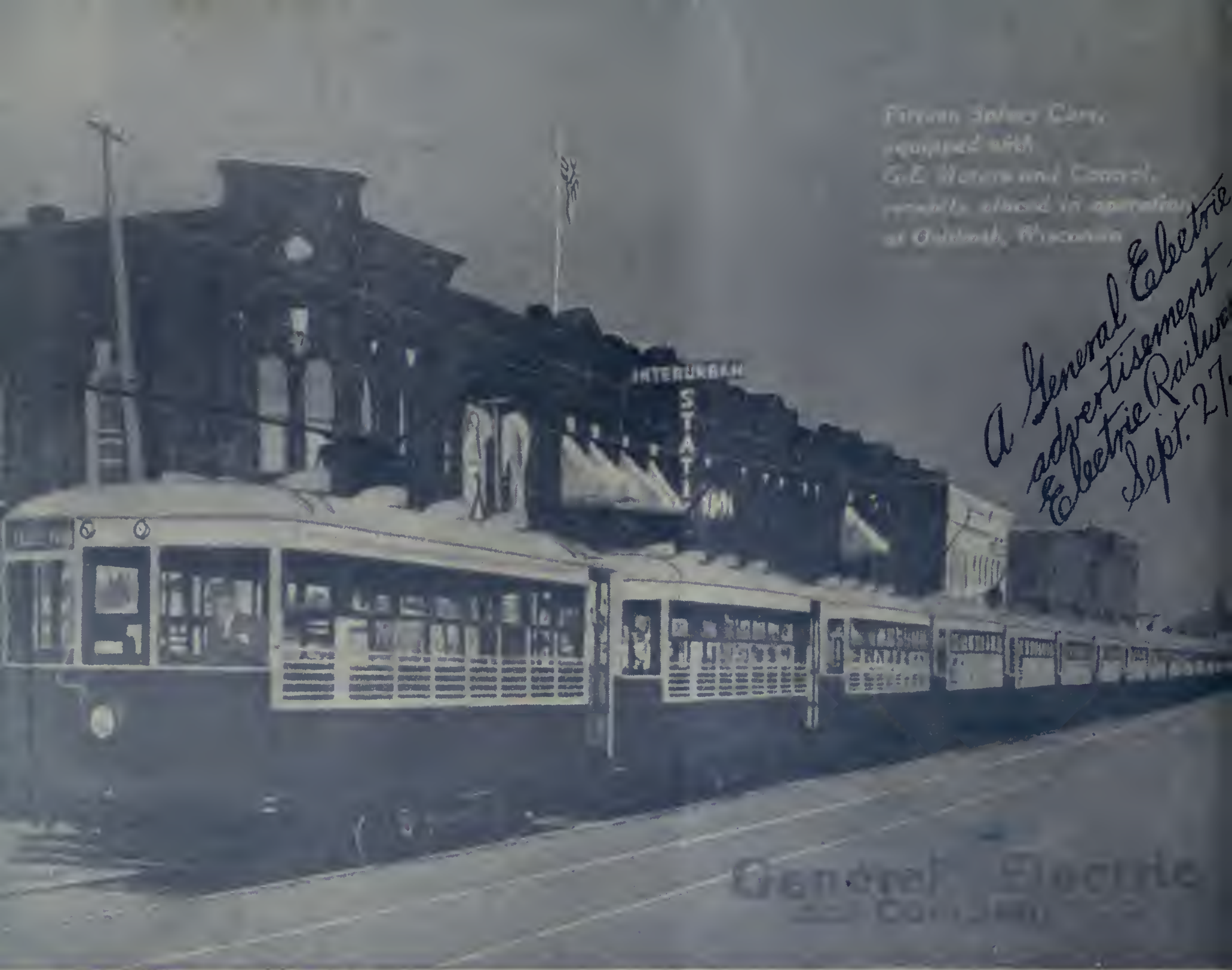
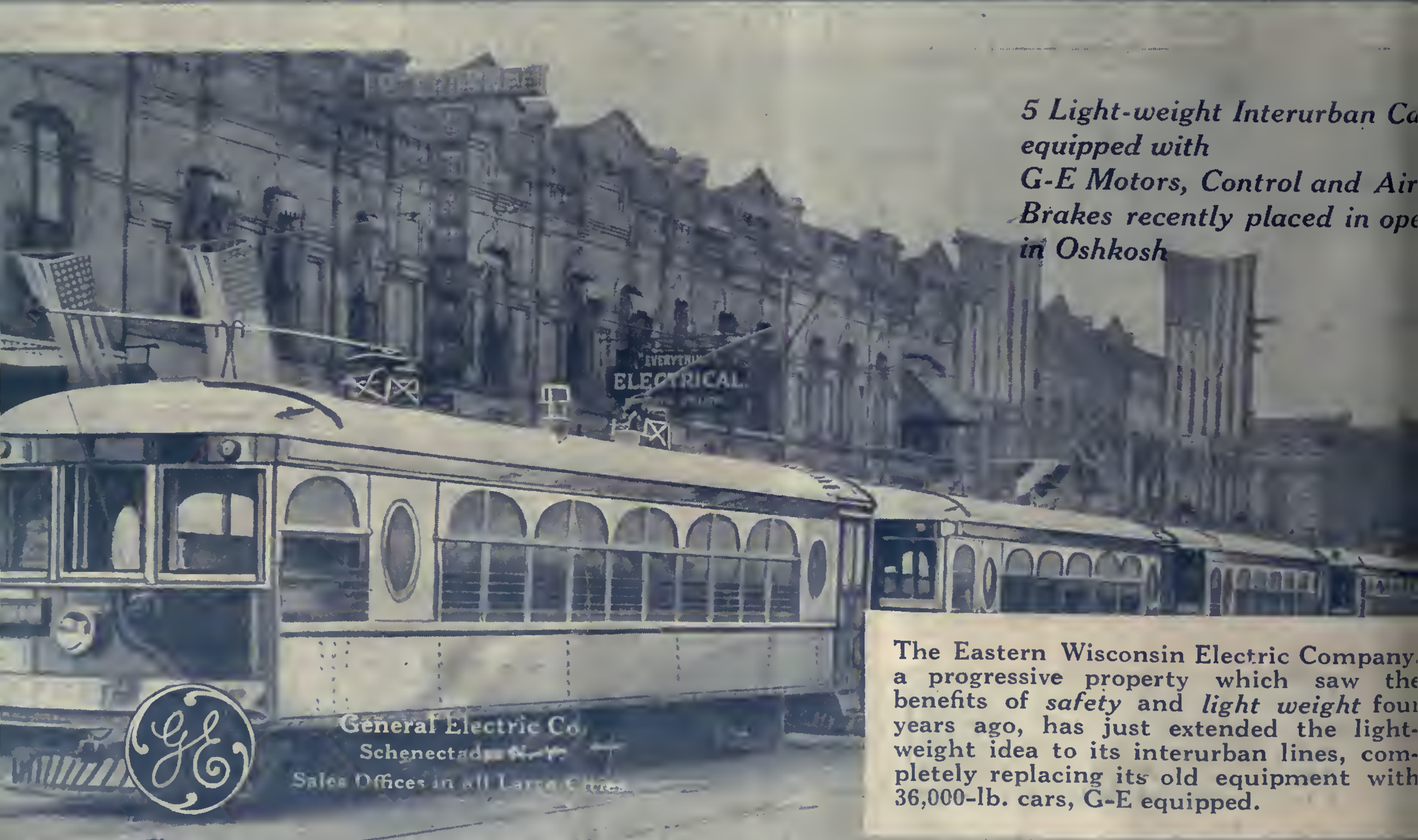
Cars and Trucks



Fifteen Safety Cars,
equipped with
G-E Motors and Control,
recently placed in operation
at Oshkosh, Wisconsin

A General Electric
advertisement -
Electric Railwa
Sept. 27.



5 Light-weight Interurban Ca
equipped with
G-E Motors, Control and Air
Brakes recently placed in ope
in Oshkosh

The Eastern Wisconsin Electric Company, a progressive property which saw the benefits of *safety* and *light weight* four years ago, has just extended the light-weight idea to its interurban lines, completely replacing its old equipment with 36,000-lb. cars, G-E equipped.

General Electric Co.
Schenectady, N. Y.
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GENERAL ELECTRIC

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ELECTRIC RAILWAY JOURNAL

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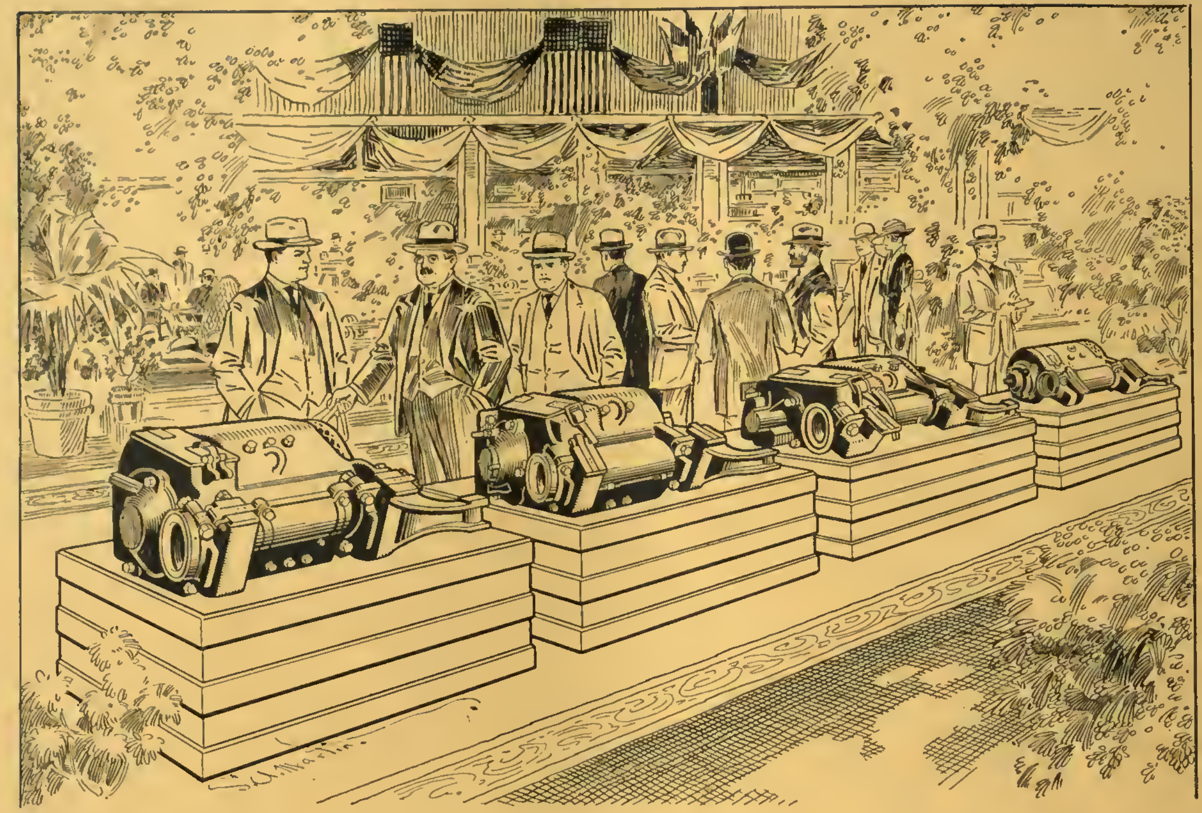

At The Convention

"Joe," said the Vice President, "I want to remind you about having each one of our men attending the convention write up a complete report when they get back home, covering all the information they pick up here. I especially want a report on this wonderful Westinghouse exhibit."

"You bet we will, Boss," replied Joe. "Three of our men are over there now right on the job. The Westinghouse people are in close touch with our problems and know the things that are of major interest to us."

"Their exhibit is the best evidence of that" remarked the Vice President.

Visit The Westinghouse Booths

There will be exhibited heavy duty and low floor HL control; typical standard motors; pneumatically controlled substation in operation; ventilation equipment for older types of motors; 50 ton freight haulage locomotive; arc welding equipment in operation; trolley line material; railway motor and control renewal parts; insulating materials; safety switching equipment; supervisory control; line switch equipment; railway shop and yard lighting equipment; Nuttall roller bearing trolley bases. There will also be on exhibit a gear hobbing machine, showing the method employed of cutting standard Nuttall helical gearing.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pennsylvania

Westinghouse

Vol. 62, *No.* 14 New York, October 6, 1923 *Pages* 545-584

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A 75,000-Word Convention Report

Next Week

DURING next week is to be held the forty-second annual convention of the American Electric Railway Association. That means that for the forty-second time the issue of ELECTRIC RAILWAY JOURNAL for next week will bring to the electric railway field the first news of what transpired at this most important convention. All the addresses, all the papers, all the committee reports and the discussions in the American, Engineering and Transportation & Traffic association meetings will be reported in next week's issue.

The JOURNAL boils down the great bulk of matter presented during the five days so that the reader may obtain from this one issue a comprehensive summary of the business and discussion of the meetings. The gist, at least, of every worth-while idea brought out is told. More important matter is given fuller treatment or printed in its entirety.

The convention closes Friday morning and the issue of the JOURNAL which goes into the mail the next day contains the full editorial account of the week's proceedings. This is virtually newspaper service in a weekly journal, but the field wants this news and the JOURNAL hastens it out. The full report of the meetings is necessarily not available until six or eight weeks later. Meanwhile this Report Number of the JOURNAL tells the story of the convention.

The proceedings of the Claims and Accountants' Associations will be published in a succeeding issue, as better treatment of them can be given than if they were jammed in with all the other matter in the first issue after the convention.

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(*Published in San Francisco*)
Industrial Engineer Electrical Retailing
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American Machinist—European Edition
(*Published in London*)

Number of copies printed 5,925

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.

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Published weekly
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
Printed in U. S. A.

Advertising Index—Alphabetical, 38; Classified, 34, 36; Searchlight Section, 33

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These motors are called upon for the most exacting service. Armatures must be especially treated to give the satisfaction expected of a new motor.

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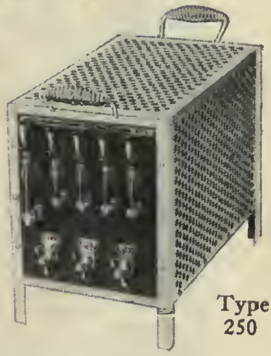
Use Westinghouse Varnish for all your dipping and baking requirements.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse

Type LW, 500-600 Volts


Type LW
250 Volts

O-B Lightweight Welders for O-B Rail Bonds

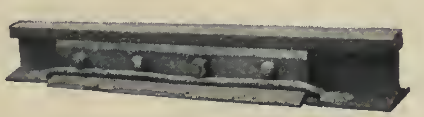
Specifications 500-600 Volt Type LW.

Weight, without accessories, 170 pounds. 17½x 21x45 inches. Plug terminal connections for 400 to 500 or 500 to 600 volts, direct current. Knife switch control for current from 30 to 210 amperes. Series resistance, nickel-chromium wire coils. A magnetically operated switch completes the welding circuit when electrode touches work, safeguarding operator from direct switching of 500 volts.

Specifications 250 Volt Type LW.

Weight, without accessories, 46 pounds. 11x15x19¼ inches. Wing nut terminal connections for 175 to 275 volts, direct current. Knife switch control for current from 20 to 150 amperes. Series resistance nickel-chromium wire coils. Like 500-volt machine frame is welded angle of light substantial construction with perforated ventilating cover.

The new O-B Booklet on Arc Weld Bonds and Welding Machines (Publication 502) is a worth while addition to your files. Write for free copy.


Bond welds like the one shown here on a Type AW-7 O-B Arc Weld Bond are easily made with the type LW Welders.

A good, neat beveled surface weld like this with an AW-8 Bond is another job for the LW Welder.

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Mansfield, Ohio, U.S.A.

Member American Electric Railway Association AERA

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Need Not Be Expensive

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with Steel Twin Ties

Steel Twin Tie Construction has lowered the first and final cost of paved track.

The utilization of the concrete formerly wasted between and below wooden ties has in every case effected a large saving in construction materials. And this saving is at no sacrifice in quality because more effective bearing is provided, both on the concrete, and the subgrade than with wooden ties, while the steel cross members serve to reinforce the foundation concrete.

Write for the folder *"Costs, Methods and Best Practice in Steel Tie Construction"* and delivered prices at your material yard.

The International Steel Tie Company
Cleveland

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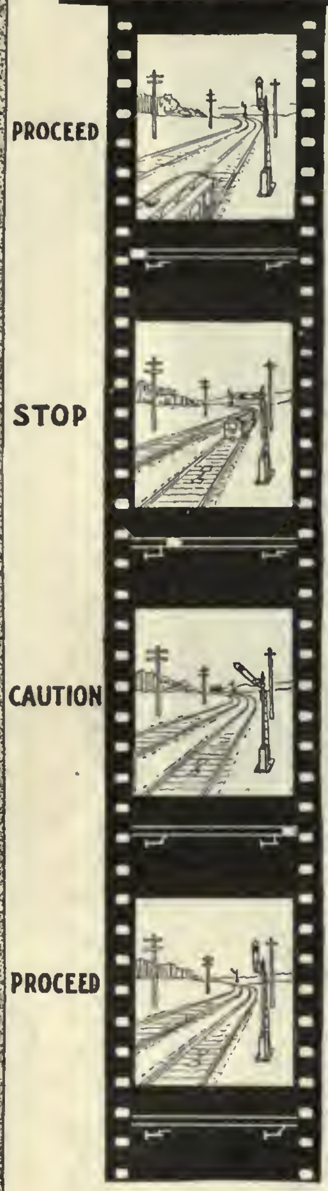
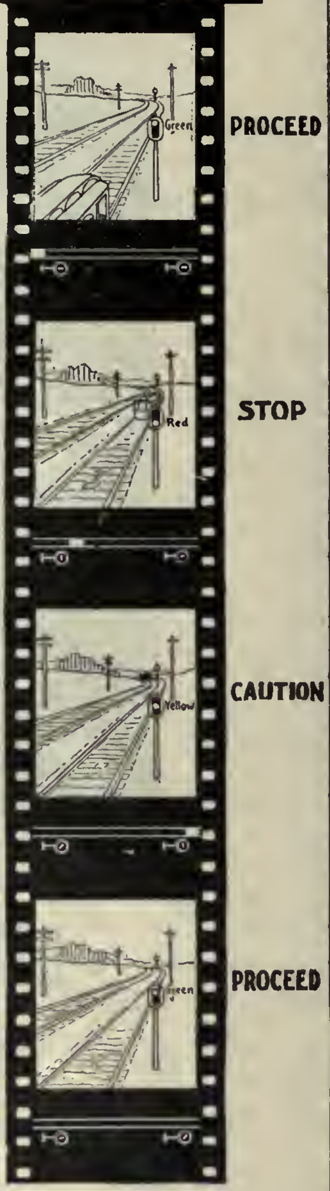


LIGHT



FOR DOUBLE TRACK *Interurban Railways*

Union automatic ▪ block signals ▪

afford a simple system of indications easily understood by trainmen.

The continuous A. C. track circuit makes possible the use of "polarized" or "wireless" control and insures the display of the proper indication at all times.

On the W. B. & A. Railroad

UNION EQUIPMENT WILL SOLVE YOUR INTERURBAN TRAFFIC PROBLEMS

Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your line.*

Union Switch & Signal Co.

SWISSVALE, PA.

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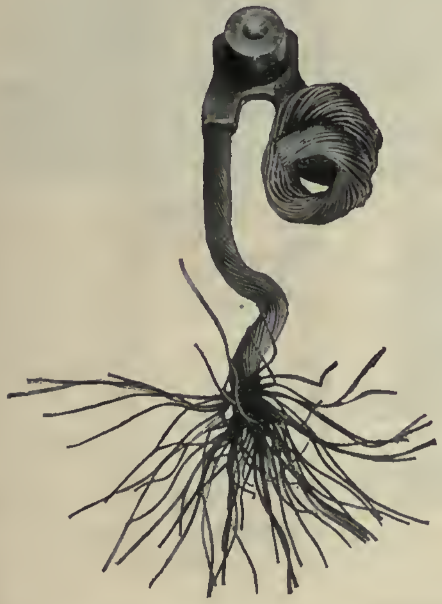
"The old reliable kind"



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"Protected" rail bonds are safe. They are made right in every detail, to withstand repeated shock and incessant vibration without breakage. Extreme flexibility is their strong point. Stranded of copper wire, with "shot-over" sleeve protection where the strands join the terminals. "Protected" Rail Bonds also have pure soft copper terminals, which will not crack under compression.

Millions in use on American and Foreign electric railways.

"The Bond with the Shot-Over Sleeve"

is the title of our 44-page booklet containing full description and details of "Protected Rail Bonds." Every maintenance engineer should have one. Samples of bonds also furnished on request.

Send today

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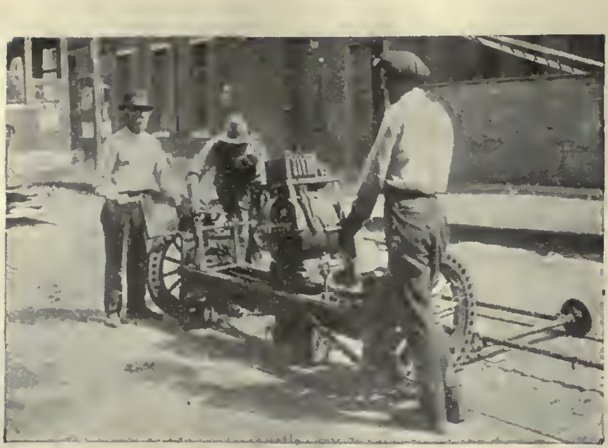

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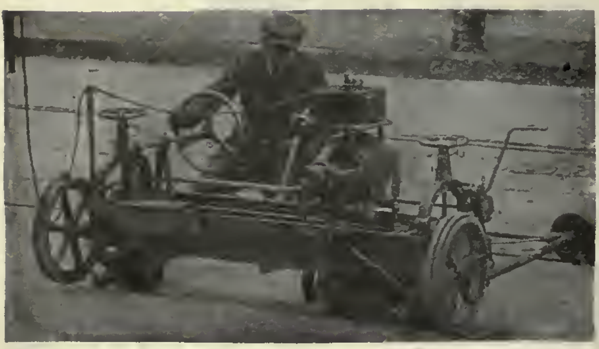

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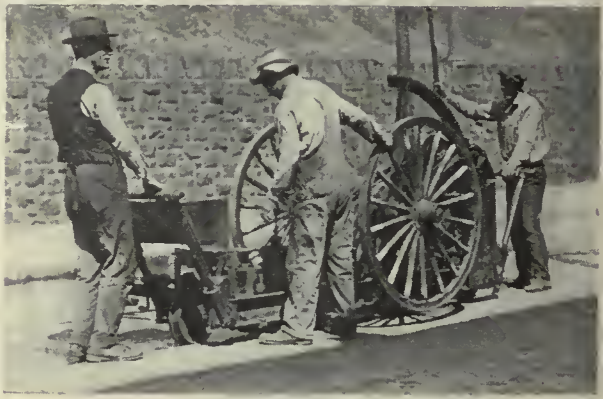

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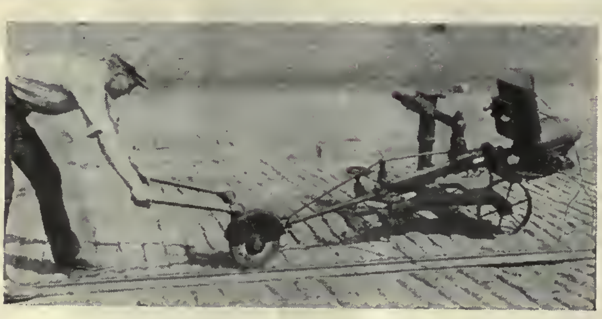

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For the Track Maintenance Department

One for Each Kind of Grinding Job

UNIVERSAL Rotary Track Grinder

1. has a tilting wheel which makes it particularly efficient around special work of all kinds; switches, frogs, crossings and grooved rail. By simple adjustment the wheel is tilted to any desired angle. Other features: direct motor drive, large rubber-tired derail wheels, adjustable outrigger, outboard bearing on grinding wheel spindle.

ATLAS Rail Grinder

2. is particularly made for following up welding operators. This machine has 30-in. carriage travel which permits operator to grind down approach and run-off at welded spot at one setting. *Light, fast, efficient.*

RECIPROCATING Track Grinder

3. cannot be equalled for removing corrugations quickly and thoroughly. *It restores the original contour to the rail head instead of grinding a flat surface.* Removal of corrugations by Reciprocating *Grinder* insures longer life for both track structure and rolling stock.

HERCULES Swing Frame Grinder

4. grinds head, back or in groove of rail—at any angle. It does everything a flexible shaft grinder can do and has none of the disadvantages of that type. Sturdy, lightweight, quick-portable, moderately priced.

The cost of these machines is trifling when compared with the saving realized by their timely use. They make possible smooth rails and smooth rails reduce the shocks and jars which destroy the track sub-structure. Keep your tracks in good shape.

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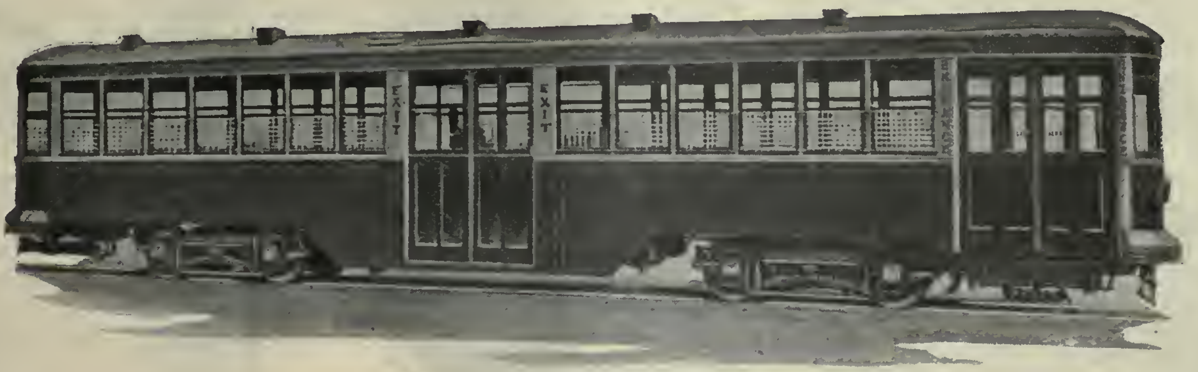

65,000 cars

Operating day in and day out, and equipped with one or more of the well-known

NATIONAL PNEUMATIC DEVICES

are daily transporting millions of people quickly and safely to their chosen destinations.

That's performance!

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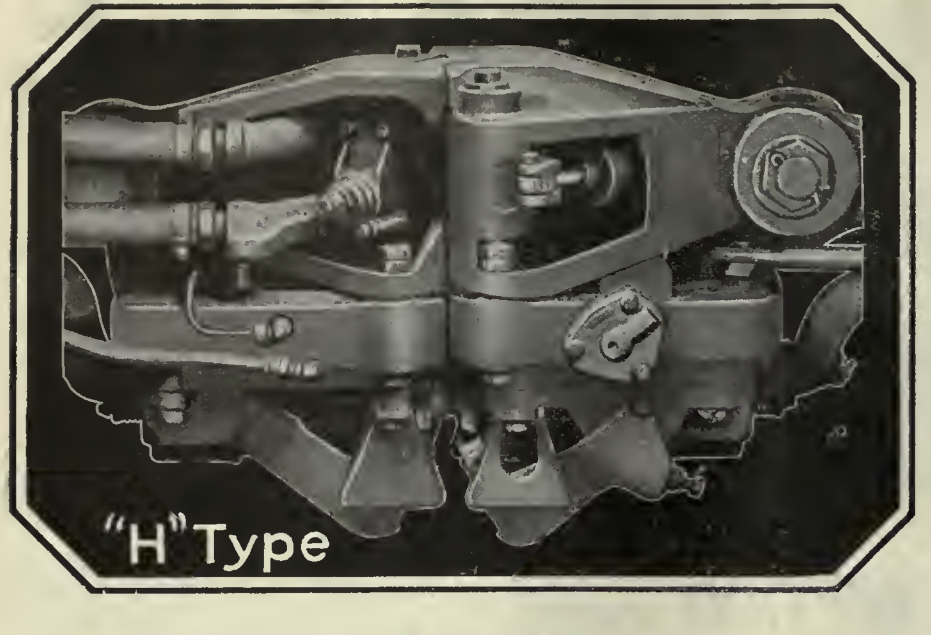

WESTINGHOUSE

Automatic "Tight-Lock"
car, air and electric
COUPLERS

Use Westinghouse Automatic "Tight-Lock" Couplers to speed up your train service. Eliminate coupling delays at the barn. Operate your cars singly if desired on the branch lines and bring them together for multiple-unit operation through the congested traffic centers. Increase the capacity of your tracks. Safe, "Tight-Lock" car, air and electric couplings are a matter of seconds—a slight impact does the job.

Westinghouse Automatic Couplers have been in successful operation for many years. Types suitable for elevated, subway and surface cars.

See them in our exhibit at the A. E. R. A. Convention

K-1-A Type

3 Sizes

Westinghouse Automatic Couplers are furnished in three separate sizes to meet the requirements of all classes of service—the "H" type for heavy, high-speed cars, the "K-1-A" for light and medium-weight cars and the "C-3-A" for light cars in cases where the electric feature is not required.

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Westinghouse Traction Brake Company
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With Galena Oils and Service in the Field

On the rolling equipment and in the power houses of electric railways in every section of the United States, Galena Lubrication Service is giving practical demonstrations of its matchless efficiency and economy.

Its long and varied experience in dealing with lubrication problems of every nature—its familiarity with all types of equipment and operating conditions—fits it pre-eminently as an authority qualified to offer dependable recommendations.

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"During the eleven months with Galena materials there was a mileage of 7,765,281, with a cost of $3,434.22. During a corresponding period in 1921 and 1922, using . . . . oils, the mileage was 7,215,340 at a cost of $4,897.52. This shows a saving by our company of $1,463.30, with an additional mileage of 549,941."

——— o ———

"Excellent results are being obtained. The average cost for the first seven months is .182. During this time there has been but one hot bearing and that due to a defective brass."

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"The improvement has been gratifying and should serve as an object lesson of the advantages of Galena Oils and service to the officials that at first were antagonistic to a contract. From the results that are being obtained I am confident that they now appreciate the use of high grade lubricants and the service we are rendering in promoting economical and efficient lubrication."

**These excerpts are taken from the weekly reports of our Service Engineers. We vouch for their reliability and accuracy in every detail.*

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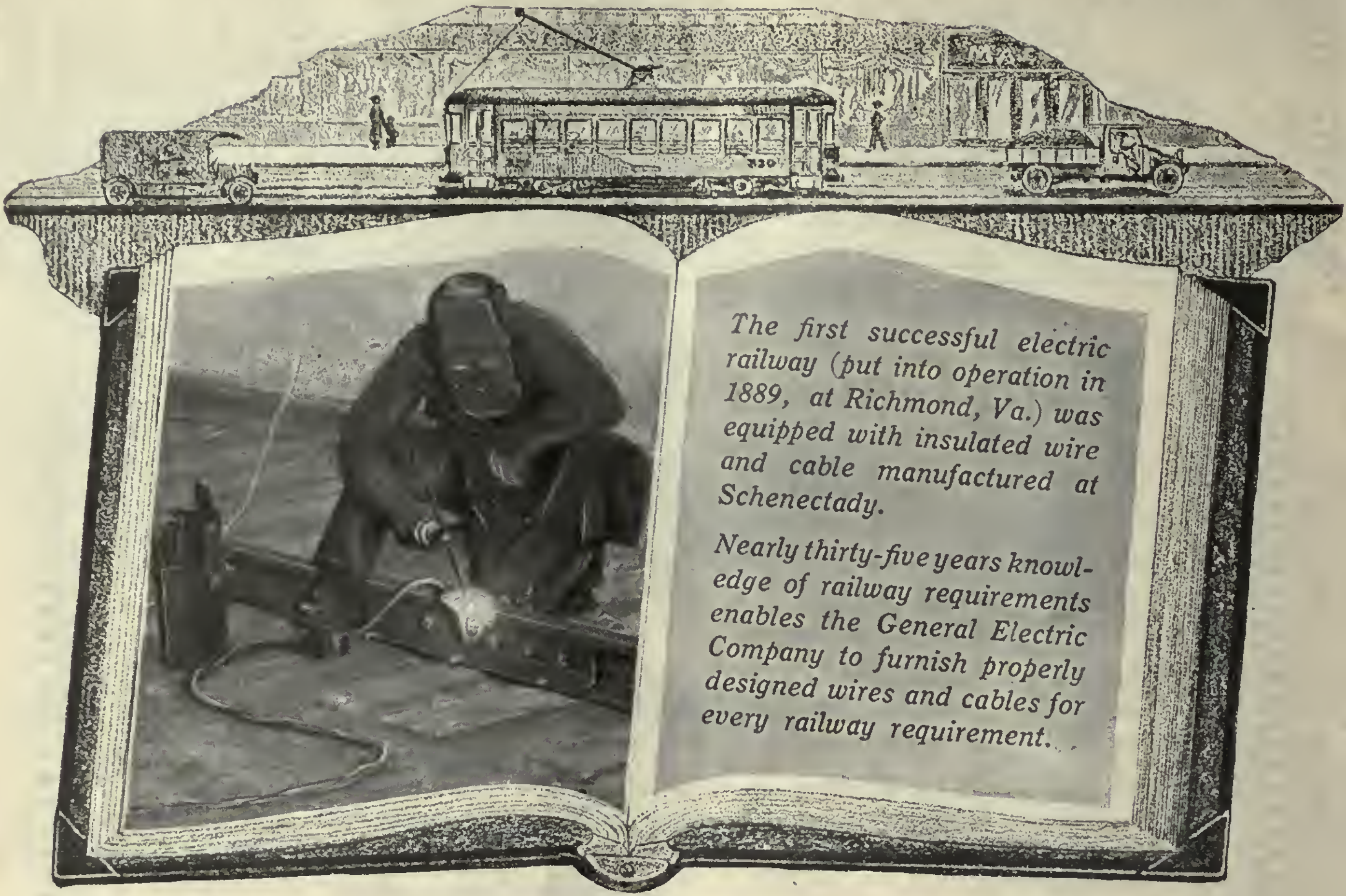
QUALITY-SERVICE-ECONOMY — GALENA OILS —



The first successful electric railway (put into operation in 1889, at Richmond, Va.) was equipped with insulated wire and cable manufactured at Schenectady.

Nearly thirty-five years knowledge of railway requirements enables the General Electric Company to furnish properly designed wires and cables for every railway requirement.

G-E Arc Welding Cable has the flexibility required for long life

For arc welding service the cable leading to the electrode holder must be very flexible to permit full control of the arc by the operator.

G-E cable for both electrode holder leads and extensions and carbon electrode leads is exceptionally flexible and long lived. It is designed especially for this service which requires maximum durability as well as flexibility.

This type of cable is of the same high quality that distinguishes the following G-E wires and cables: Car and locomotive wiring cable, motor leads, mining machine cable and special cable for all purposes, magnet wires—enamel, cotton, silk and asbestos covered.

General Electric Company
Schenectady, N. Y.
Sales Offices in all large cities

GENERAL ELECTRIC

New York, Saturday, October 6, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 14

New Jersey Tries a 5-Cent Fare on a New Basis

THE four months trial of the so-called 5-cent fare in New Jersey is an experiment that will be watched with keen interest by the entire electric railway industry. It should be understood, however, that this is by no means a return to the nickel trolley fare which existed before the war. Under the new plan many former single-fare lines become two-fare lines, and the cost of the ride to dwellers in the suburban towns is now 10 cents, or twice the pre-war rate. Then, too, the abolition of the transfer means a 10-cent rate for thousands of trolley patrons. Only local riders in the larger communities will really have a 5-cent fare—but this is about 50 per cent of the total riders.

In the 146 municipalities in which the Public Service Railway operates may be found an infinite variety of traffic conditions. For example, the situation in Newark, a city of half a million people, is very different from that in Bergen County, where the largest town has a population of less than 20,000.

The nature of competition between the trolley company, the railroads and the buses is equally dissimilar in different sections of the state. In fact, the difficulty of establishing a single fare that would suit all the varied requirements of the situation has always been a stumbling block in the determination of a reasonable rate. No doubt alterations in the new arrangement will have to be made here and there to meet local conditions, but there is a good possibility that the fundamental principle of this plan may turn out to be the solution of the trolley problem in New Jersey.

Of course the buses are still there, and the company is still confronted with unfair competition, for the bus and the railway are by no means on an equal basis of taxation and other imposts. The main thing accomplished is that the insatiable clamor for a 5-cent fare is largely met—at least Jersey has what it can call a 5-cent fare. Many of the jitney patrons may therefore come back to the railway. Whether the number of such new railway patrons will be enough to produce an actual improvement in revenue remains to be seen.

The Future of the Rail-Bound Vehicle Is the Future of Transportation

THIS is an age of progress we are living in. The radical changes in car design described in the Annual Convention Number last week indicate that progressive electric railways are alive to that fact, and are acting to improve the facilities at hand to the best of their abilities. There is, however, a broader movement in the transportation field that must be reckoned with—the place which the rail vehicle will have in the transportation plans of the future.

Up to the present time there is no question that for heavy passenger and freight service electric railways and steam railroads can furnish the best service at a cost well below that possible by vehicles moving on the public highway. This has been proved time and time again. Several cities have had the unfortunate experience in the recent past of putting up with bus service exclusively, and all of them have been glad to get back to the old reliable trolley car.

There is, however, a field for the bus, and this field will be found. In its proper place the bus is a valuable auxiliary of the trolley. In some places it can do work the trolley cannot do equally well. Popular prejudice against the railway corporations have also had an effect in furthering the development of the bus, but attention to better public relations is counteracting this tendency.

The lesson derived from the recent experiments with exclusive bus transportation is that, where it is fitted to carry the traffic, the main difficulty is that the operators are also the owners of the vehicles, with no definite responsibility to anyone, and with very loose supervision from the busmen's associations and the public authorities. In consequence the practices indulged in have not been of the best. Courtesy and carefulness, which are demanded of the trainmen, have been sadly lacking.

Unregulated competition has all been on the side of the bus.. It has not been subject to the same restrictions that have been imposed on the electric railway, partly because it is a new form of transportation, partly because there is no large fixed investment through which the owners can be reached, but more particularly because there is no competent head to the business, and it is difficult for the public to deal with a large number of individuals of various temperaments and desires and largely irresponsible.

To develop transportation facilities in any community as they should be developed demands that the problem be treated as a whole, and that a broad policy be adopted to fit each unit into its proper place in the scheme. Do this intelligently and community transportation will progress; otherwise it will go backward. The electric railway, having been in the field of urban transportation for many years, has built up the organization and has the background of experience fitting it to carry on the work of transportation for which it is trained and competent. If our urban systems need to be revamped, the present companies are the ones best fitted to do it, and they can utilize the existing investment to best advantage in any scheme whatever that contemplates increased facilities. In any community the rail lines should render at least the bulk of the service, and the buses should be co-ordinated with them in one coherent system. This will provide the cheapest and most satisfactory service.

It must not be forgotten, however, that there are rivals who are always looking for an opportunity to enter the field as competitors. Knowing little about the transportation business, but being able to command funds, they appear willing to invest considerable sums in experiments that seem doomed to failure. But in making such experiments the railway itself may be bled by the competition until it, too, is forced to the wall.

Just how the transportation system will ultimately be worked out is a local problem for each community. In the larger cities rapid transit lines will, of course, take the heaviest part of the travel, particularly in the rush hours. This will be supplemented with surface cars and buses furnishing local and crosstown service, feeding the rapid transit lines. In smaller communities the trolleys will be used for mass transportation, the buses serving lines that do not require the most intense service or which have small peak-load demands. But in all save the smallest communities, where the local requirements are at a minimum, the electric car can and will do the work best, provided it is given a fair chance and the management shows a desire to progress and to co-operate with the residents.

Thus it is the duty of the railway man to look to the future, to plan ahead farther than he ever has done before, and to keep the situation well in hand so that he is able and ready to meet the demands of modern travel. In this way he can conserve the investment his company has made and utilize it also for the interests of the public at large.

In fact, it now appears that while there may be some doubt as to the future financial success of the railway by itself, there is no doubt that the future of transportation—railway, bus and whatever other vehicle comes along, in a combined, co-ordinated system—will be one of substantial success.

The Eternal Conflict Between Divisional and Departmental Organization

WHEN an electric railway supplies service to a number of more or less isolated communities, problems of organization arise which do not occur with a more centralized system. On the latter, it is usual, of course, to have all division superintendents and foremen report directly to their respective department chiefs.

Where there are distinct and independent communities to be served, however, it is often desirable to adopt a divisional rather than a departmental system of responsibility and control. The reason for this is that the public relations in the independent community can often be improved if a division manager, with considerable responsibility for the operation of the service in his division, can be substituted for a division superintendent with little or no authority. But with a plan of this kind, to whom should the local maintenance-of-way man and local repair-shop superintendent report?

Practice differs in this matter. Obviously, in questions relating to engineering standards to be used, the head engineering office should control, but on any other subject the division manager might want to have a good deal to say, if not the deciding voice.

There are advantages in both the divisional and departmental plans. It is traditionally hard to have to report to two masters, yet with the divisional plan this is just the position in which the local shop superintendent and way engineer are placed. Reasons of efficiency will tend to urge the departmental arrangement, public relations the divisional plan. A combination of the two, in different proportions to suit each case, is probably the only course which can be recommended.

It Isn't So Much the "Rubber Urge" as the Desire for Continuous Running

THIS is an age of rubber, but it is also an age of continuous motion. Applied to mass transportation, it isn't so much a question of rubber as it is a matter of uninterrupted running that the people want. The most uncomfortable factor in a street car ride is the frequent stopping. Instead of permitting ourselves to feel that the rubber urge cannot be counteracted, perhaps we would do much better to study the local situation with an idea of determining how to secure such traffic regulation as will enable more nearly continuous motion of the street cars.

Application of the principle of express service to street cars has been tried to only a very limited extent, and then usually without correlated traffic regulations. By setting aside certain streets for this type of service, just as we now set aside certain boulevards for through automobile traffic, it would be possible greatly to increase the speed and pleasure of transportation by street car. One of the reasons for the unprecedented development of automobiles has been the education of the public, inspired by automotive manufacturers, to the fact that adequate traffic regulations are as important to the utility of the automobile in cities as the design of the vehicle itself. This is equally true of the street car, but it has not been "sold" to the public. Every attempt to improve street car operation, as for example the skip stop, is met by vigorous protest on the part of local business interests and petty politicians.

When we realized that vehicular congestion was limiting the utility of the automobile we established express streets or through boulevards. The establishment of supplementary through traffic streets in ordinary residence districts has been a more recent development of this idea. All of this is for expediting what to at least a large degree is non-necessity traffic. It serves the privileged minority rather than the masses.

When we approach the problem of providing transportation for the masses who daily ride the street car systems of our larger cities, however, we allow the interests of the corner store merchant, whose business is made better at his location by the presence of the car line, absolutely to prevent any material improvement in the type of service rendered for transporting the workers, upon whose regular movement back and forth each day the very foundation of the entire economic and social structure is built!

In addition we do other peculiar things. We carefully regulate boulevard traffic so that slower moving cars will keep to the right and allow the faster moving stream to proceed through the center of the street. On car lines, however, we allow slow horse-drawn vehicles to keep to the tracks with immunity, which results in slowing up the entire stream of necessity traffic. We also carefuly regulate parking on boulevards or through traffic streets, but we often allow unrestricted and promiscuous parking on car line streets.

In most cities the construction of elevated or subway structures, which in addition to being expensive are either unsightly or uncomfortable, is entirely unwarranted. A service approaching rapid transit in speed and safety may be provided by the establishment of express surface car streets. Here, a maximum of one or at most two stops per mile would be made. The local traffic would be handled by frequent local service on adjacent parallel streets—perhaps using buses instead of cars.

Mechanical and Electrical Equipment Keeps Pace—II

Brakes Redesigned for Newer Conditions—Component Parts More Rugged and of High-Grade Materials—Tendencies Toward Simplified Multiple-Unit Control—Current Collectors Improved—Motors and Trucks Covered in Last Week's Article

ADVANCES in design of the equipment of the modern car have not been confined to the trucks and motors, which were discussed in the article on this subject in last week's Annual Convention Number of ELECTRIC RAILWAY JOURNAL. Progress has taken place in practically all the details, and parts are being produced that function with greater reliability, while at the same time they are light in weight.

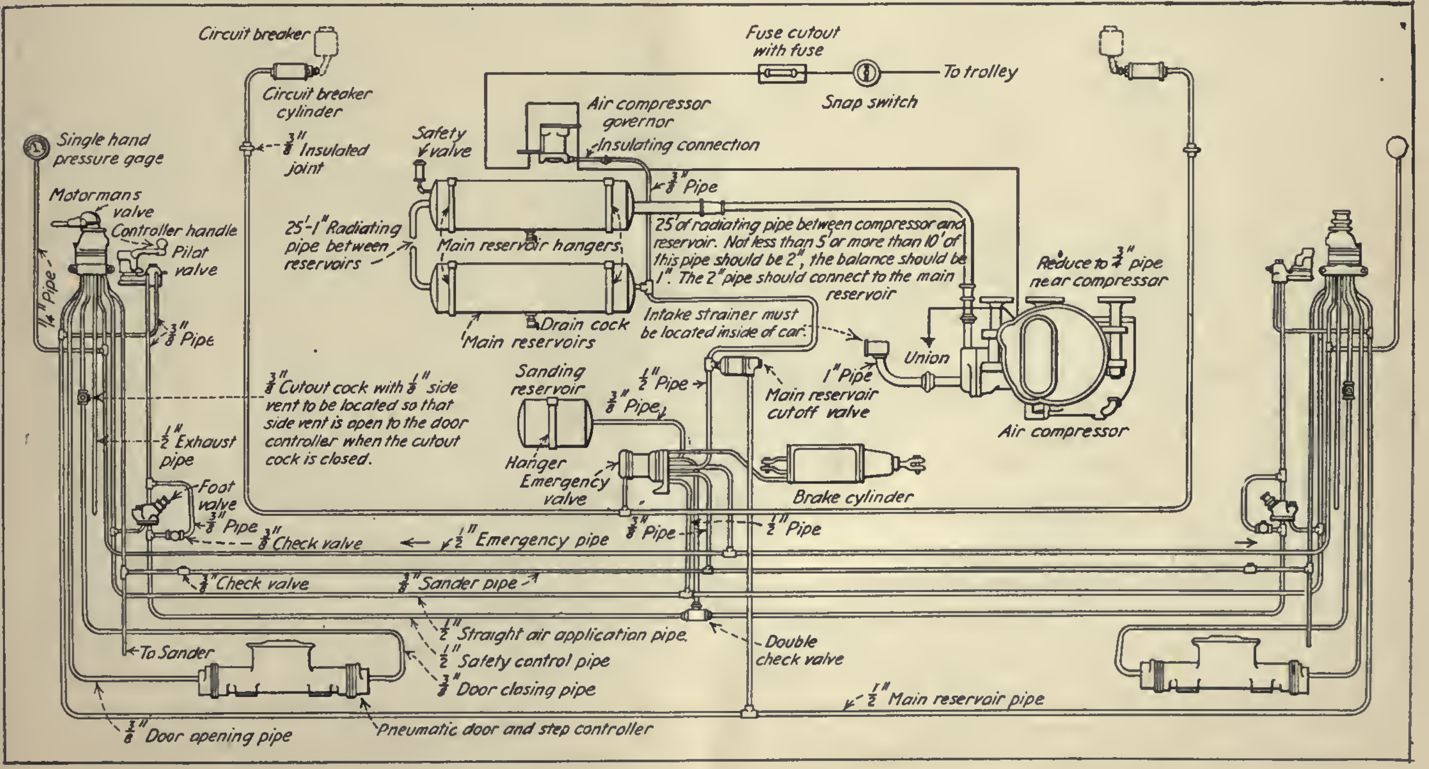
AIR BRAKES REDESIGNED FOR NEWER CONDITIONS

The development of air brakes and the urge for refinement in the performance of the brake itself and its related apparatus is attributable directly to the ever-increasing necessity for maintaining maximum schedule speeds with a limited maximum speed, and also to the continually increasing requirement of obtaining maximum possible safety and smoothness in operation with the greatest possible degree of flexibility in performance. Successful operation of surface cars in modern traffic congestion while maintaining high scheduled speeds has been very largely dependent upon the development of the various parts constituting the air brake equipment so as to provide rapid retardation.

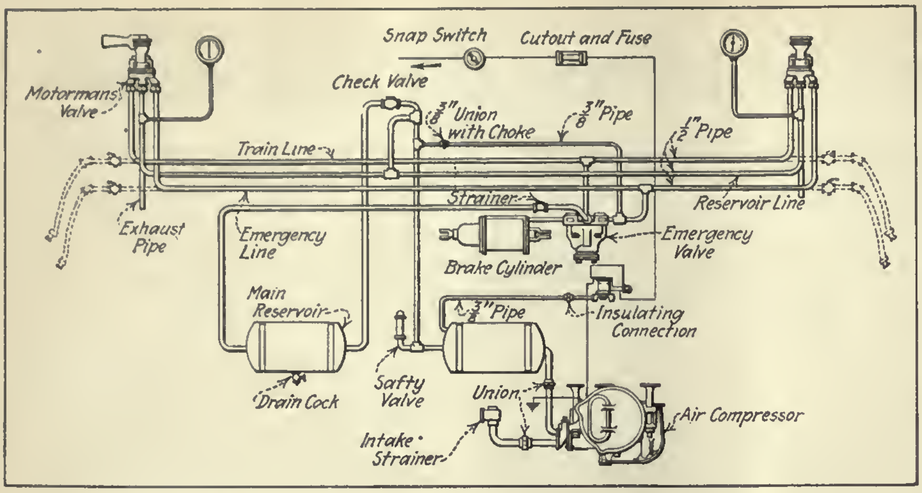
The development of light-weight cars has presented a difficult air-brake design problem which is due to the same conditions as the spring problem previously described. The relatively large ratio between live and dead load has meant a combination of conditions which could not be properly fulfilled without some additional modification in the brake performance. It became increasingly difficult to provide a braking ratio which would operate satisfactorily with an empty car and at the same time give the rate of retardation required properly to control a fully loaded car in congested districts. In the same way, if the brake was designed properly to handle the heavily loaded car, operation of an empty car was carried out with so high a ratio that serious danger existed from skidding on greasy rail.

This condition has led to the development of a variable load brake device, designed to permit the use of a braking effort which will be sufficient for the loaded car and yet to so control the pressure in the brake cylinder that this will be automatically adjusted as the live load on the car decreases. The adjustment effected by this device is accomplished through the movement of the body bolster relative to the truck transom as the load on the car is increased or decreased.

The mechanism consists of a simple rocker arm supported by a bracket from the body bolster so that it can make contact with a fixed point on the truck transom. A vertical movement of the body bolster produces a rotation of the rocker arm about its supporting bearing, and this motion is transmitted through a strut to a valve mechanism which really amounts to an adjustable limiting or reducing valve.



Piping Diagram for Standard Double-End Safety Equipment

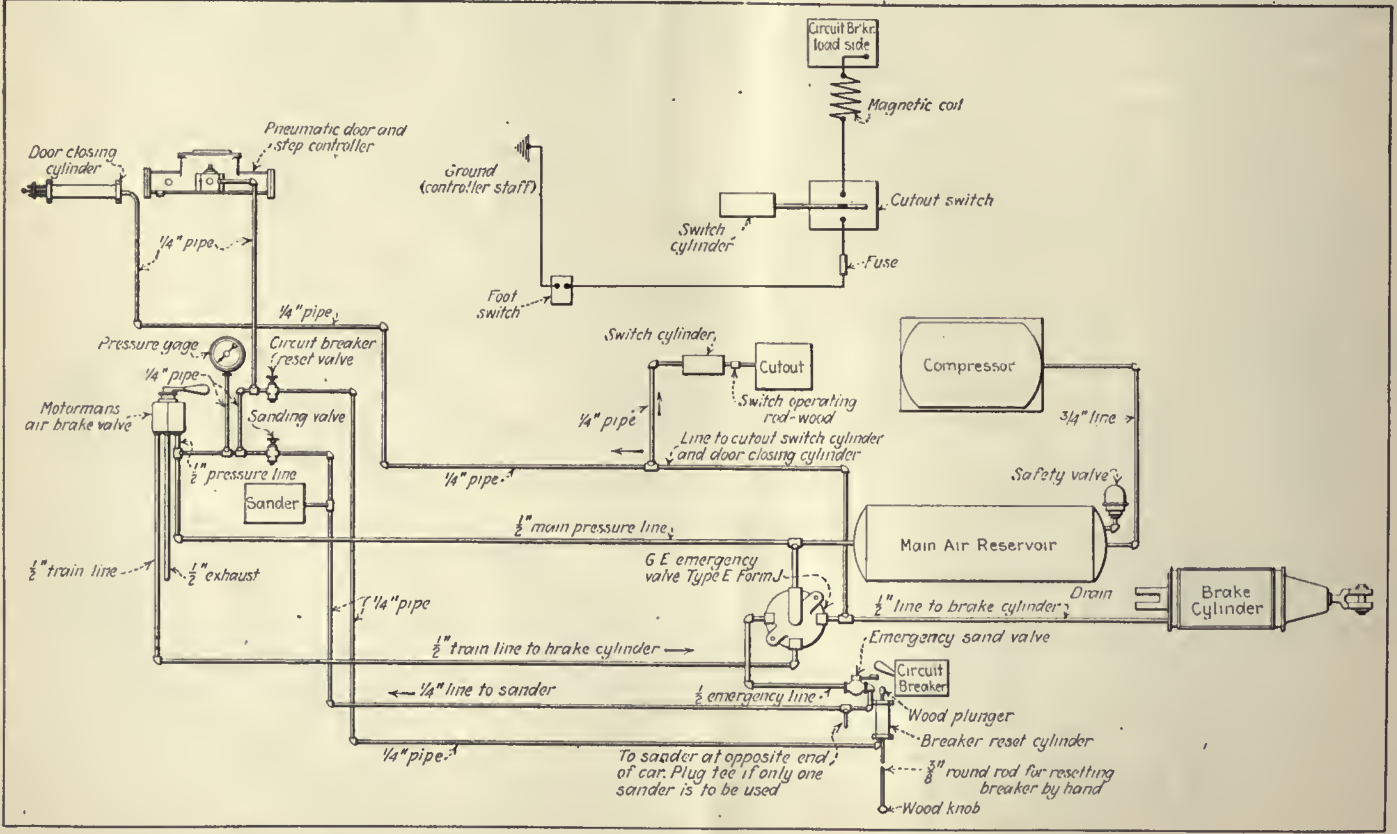


Piping for Straight Air-Brake Equipment with Sensitive Emergency Action

To prevent excessive wear between the bolster rocker arm and its point of contact on the transom, a small air cylinder is inserted in the strut in such a manner that the length of the latter is increased or decreased by the admission or release of air from this cylinder. Through the medium of door contacts and magnet valves, air is allowed to flow to this small cylinder when the doors are open and is released when the doors are closed. Consequently with the doors open the strut is considerably longer than when the doors are closed, and therefore the bolster bell-crank is allowed to remain in position to make contact with the transom member only during the period that the car doors remain open. The movement of the connecting strut caused by such contact is transmitted so as to adjust the setting of the limiting valve to prevent use of more than a predetermined brake cylinder pressure, corresponding to the existing load on the car. Consequently, each time the car is stopped and the doors are opened, the limiting mechanism is reset to take care of any change in the passenger load on the car, and the motorman is automatically prevented from using more than the proper brake cylinder pressure for making the next stop. This device has been applied to cars of the Eastern Massachusetts Street Railway and also in Brooklyn and Boston, and has been reported to accomplish the object sought in such a manner as to allow very much better braking performance than was possible before, under the wide range of car loads encountered.

An additional problem connected with the design of air-brake equipment has been presented by the use of two-car train units on many properties. The advantages of the straight air-brake equipment from the standpoint of simplicity and low cost made this form of equipment very desirable for use on trains of this type, particularly since it also represents the proper equipment for operation of the cars singly. To provide safety in the operation of such trains, some form of emergency mechanism was required in order that a parted train or burst air hose would produce an automatic brake application.

In the earlier equipment designed for this purpose, the emergency valve was arranged so that the emergency line also served as the supply line. Consequently, in order to permit a sufficiently rapid service application of the brakes to be made, it was necessary to increase the size of the by-pass port in the emergency valve to a point where the


Circuit Br'kr. load side
Magnetic coil
Pneumatic door and step controller
Door closing cylinder
Ground (controller staff)
Cutout switch
Switch cylinder
$\frac{1}{4}$" pipe
Fuse
Foot switch
$\frac{1}{4}$" pipe
Switch cylinder
Cutout
Compressor
Pressure gage
Circuit breaker reset valve
$\frac{1}{4}$" pipe
Switch operating rod-wood
Motormans air brake valve
Sanding valve
$\frac{1}{4}$" pipe
Line to cutout switch cylinder and door closing cylinder
$\frac{3}{4}$" line
$\frac{1}{2}$" pressure line
$\frac{1}{4}$" pipe
Safety valve
Sander
$\frac{1}{2}$" main pressure line
Main Air Reservoir
$\frac{1}{2}$" train line
$\frac{1}{2}$" exhaust
G E emergency valve Type E Form J
Drain
Brake Cylinder
$\frac{1}{4}$" pipe
$\frac{1}{2}$" line to brake cylinder
Emergency sand valve
$\frac{1}{2}$" train line to brake cylinder
Circuit Breaker
$\frac{1}{4}$" line to sander
$\frac{1}{2}$ emergency line
Wood plunger
Breaker reset cylinder
$\frac{1}{4}$" pipe
To sander at opposite end of car. Plug tee if only one sander is to be used
$\frac{3}{8}$" round rod for resetting breaker by hand
Wood knob

Type of Safety Control Developed for Tri-City Railway for Single-End Equipment desired sensitiveness in operation of the valve was difficult to obtain. This was particularly true in attempting to obtain emergency application of air from the motorman's brake valve.

This form of apparatus has been improved by taking air for the service application of the brakes from an individual supply line leading from the reservoir, and consequently the speed of brake application can be made as rapid as the size of the supply line and the port in the brake valve will permit.

The by-pass port, which regulates the functioning of the emergency valve for a given pressure reduction in the emergency line, may therefore be made as small as desirable. Hence, positive emergency action on both cars in a two-car train is insured when the motorman's brake valve is moved to an emergency position, or when the emergency pipe pressure is reduced suddenly by any other means, such as the opening of a conductor valve, the bursting of an air hose, or the parting of a train.

Thus, we find air-brake equipment undergoing in various ways development for the purpose of making it more suitable to the particular type of service in which it is to be utilized. One outstanding characteristic of the service requirement of traction brakes is that this service involves very frequent applications of the brakes, and these applications must usually be made as rapidly as possible. The entire design of apparatus and the various pneumatic devices utilized are influenced by this requirement.

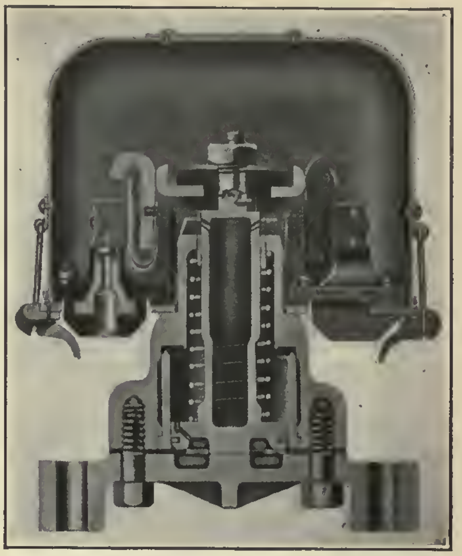
THE AIR BRAKE COMPONENTS

The modern car air compressor is a very efficient and rugged piece of mechanism, and recent developments have consisted more in the nature of refinement in the design of parts and an increasing vigilance in manufacture to insure proper fitting and alignment of parts than in any outstanding change in the function of parts. The primary developments have been in the manner of driving from the motor element to the compressor element and the design of the complete assembly for mounting under low-floor cars. In addition, simplification in suspension arrangements has been accomplished.

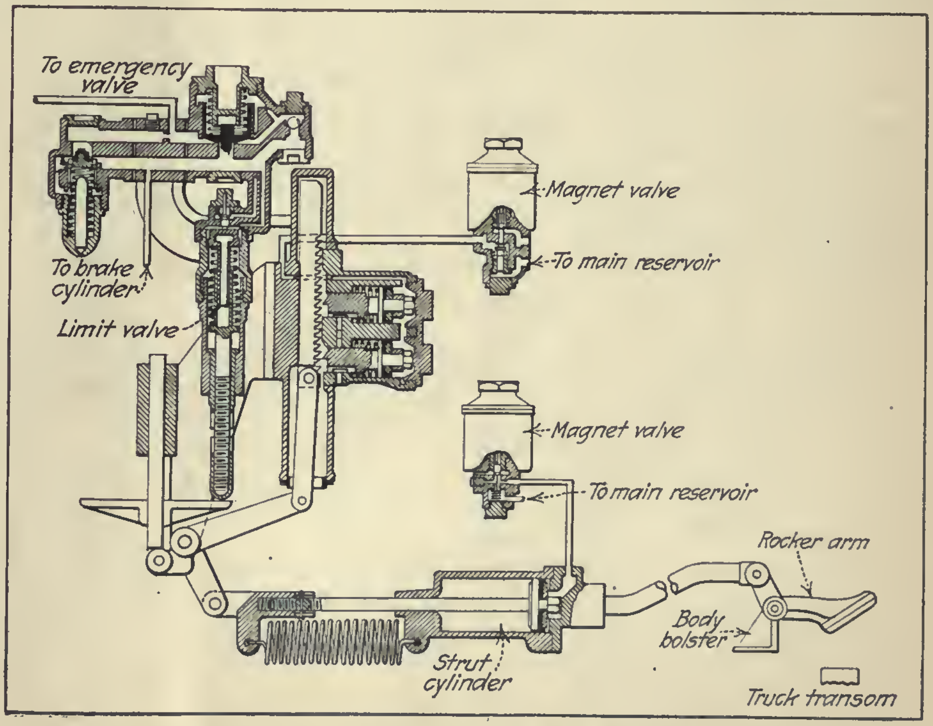
It may also be said that refinements in design for the purpose of reducing vibration have made possible the utilization of higher speeds with considerable savings in size and weights.

The brake cylinder, which is a comparatively simple piece of mechanism, is nevertheless the very heart of the brake system, and it has always presented the problem of providing proper lubrication and insuring against leakage. Many different types of rings and packing have been designed for the purpose of overcoming the tendency of the oil used for lubrication to leech out the filler in the ordinary type of leather packing. A considerable advance has recently been made in the development of a packing ring made of a composition material which is reported not to deteriorate in oil.

In considering the future development of air-brake equipment, the advantages of the utilization of higher-grade materials and lightweight alloys apply in the same way that has been described for the other parts of the mechanical and electrical equipment on cars. This development, as applied to air-brake parts, is limited by the operating economies which may be expected to justify the increased manufacturing costs entailed. This is particularly true of the compressor equipment. As applied to the fittings and other pneumatic devices incorporated in the air-brake equipment, the limit to reduction in size of parts, particularly the housing castings, is fixed by the necessity for maintaining a sufficiently large body of metal to withstand the strains imposed during assembling, and also to protect the actual operating parts from abuse during both assembly and subsequent maintenance in service. The requirement for what may at first appear to be an excessive amount of metal in some pneumatic device castings is entirely a matter of this mechanical protection to the operating parts, and is entirely distinct from any consideration of the actual air pressure to which the part is subjected. For this reason possible development in the application of pressings or lighter castings of higher-grade materials is largely limited.

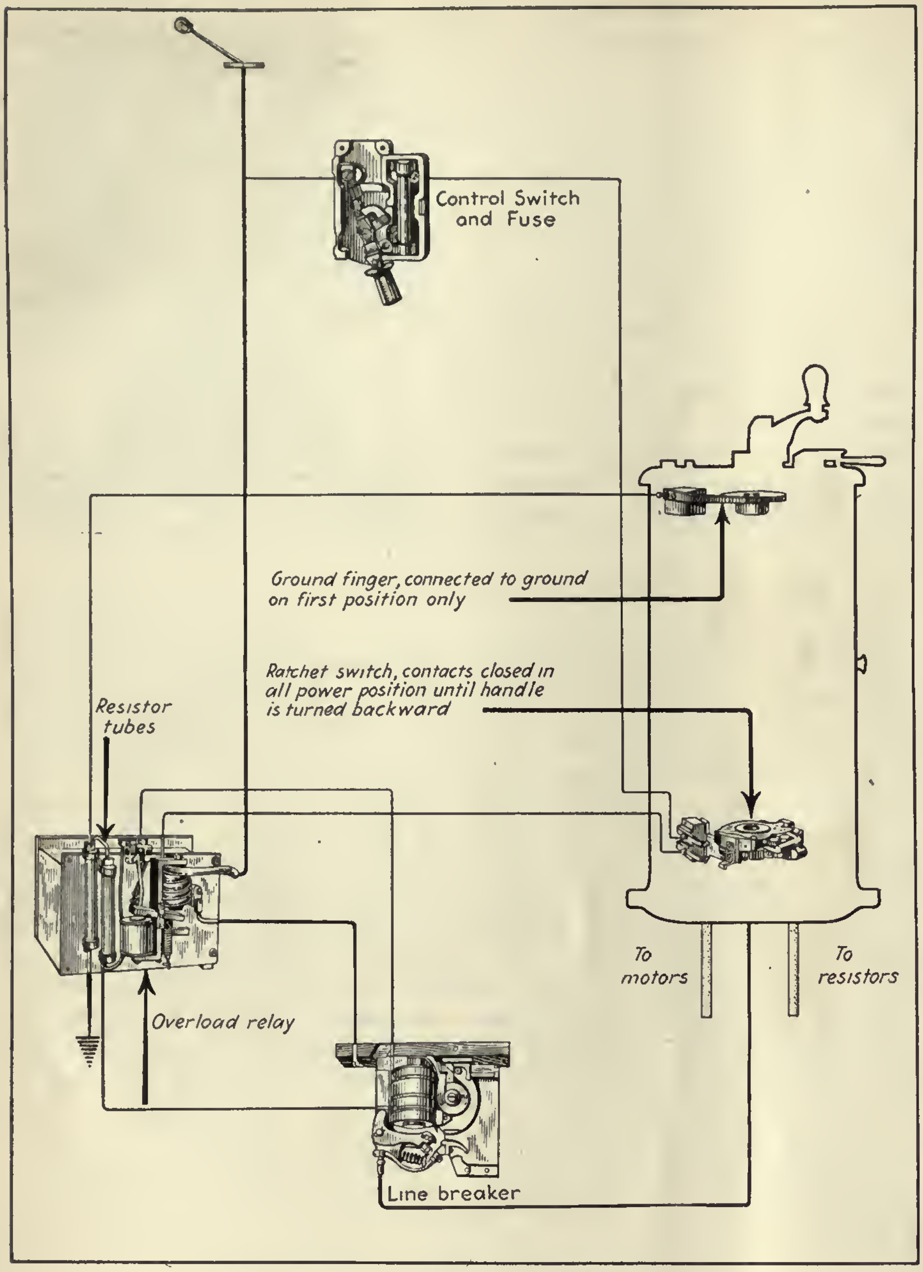


A Modern Type of Mechanical Air-Brake Governor



This Variable Load Device Adjusts the Braking Effort to the Weight of Passengers

The functions performed by the air brake in providing for safe oper-


Control Switch and Fuse
Ground finger, connected to ground on first position only
Ratchet switch, contacts closed in all power position until handle is turned backward
Resistor tubes
Overload relay
To motors
To resistors
Line breaker

Connections of Drum Controller and Ratchet Switch with Line Breaker Mounted Under Car

ation of street cars under congested conditions were suddenly expanded to a remarkable degree with the introduction of one-man operation. Under such conditions the requirement for maximum safety dictated that the air brake and its auxiliary apparatus provide for automatically performing the duties of the operator in stopping the car, in the event of his becoming suddenly incapacitated. In addition it was desirable to make the act of stopping the car in an emergency as simple as possible. With the duties of motorman and conductor both combined in one man, it was also important to simplify the operation of doors, sanders, etc. These various requirements are all combined in the safety car apparatus, and represent an interesting example of the important part played by the air-brake equipment on the modern car.

An accompanying drawing illustrates the arrangement of the original safety car apparatus. Various other combinations of equipment have been brought out to perform similar functions on a one-man car, and a type developed in Davenport and applied to one-man cars of the Tri-City Railway and others is illustrated.

FOUNDATION BRAKE RIGGING

The design of foundation brake rigging is of extreme importance in connection with the elimination of rough stops, which are one of the fundamental factors in affecting the comfort of an electric car ride. From the standpoint of safety, the design of foundation rigging is of paramount importance. There has been an increasing appreciation on the part of car designers of the importance of devoting proper attention to the layout of brake rigging in order to obtain smooth and equalized application of the shoes to the wheel. This has been partly discussed under the subject of truck design. In the design of the foundation rigging on the body, the increasing tendency to use boxed-over jaws and safety stops to insure obtaining a brake on at least one truck in the event of a pull rod failure is a step in the right direction.

There has also been increasing attention given to the matter of holding down the maximum allowable total leverage ratio, so as to prevent obtaining excessive piston travel as the result of body center bearing wear, play in the axle journals, or any movement of the truck element relative to the body, when the brake is applied. A total ratio not exceeding 12 to 1 is now considered the maximum allowable for good practice, and this ratio should be decreased if there is a possibility of obtaining any appreciable slack in the rigging when the brakes are applied.

The hand-brake equipment on electric cars should be installed so as to be operative at all times. There is a tendency to use various forms of helical quick-take-up castings in connection with the hand-brake rigging for the purpose of taking up slack chains rapidly. It is considered good practice to use either this form of quick-take-up or some type of gearing to insure against serious decrease in the effectiveness of the hand brake, when a chain length greater than 24 in. is required in the leverage layout. Where a quick-take-up casting is used, it has also been found necessary to guard against obtaining excessively short piston travel, as this will result in the brake application being made with the chain on the large part of the take-up cam and a consequent serious loss in the effectiveness of the hand brake. It is also considered good practice, as a safety precaution, in the design of hand-brake rigging to insure a hand-brake application developing forces in all brake levers in the same direction as are developed by the application of the air brake.

There have been considerable advances made recently in the design of control equipment. The most outstanding of these developments has been the successful design of multiple-unit control for operation on light-weight city cars, by a general simplification, reduction in size and weight, and improved arrangement to afford readier accessibility of the parts for maintenance. This development has taken place as the result of an increasing use of multiple-car trains in city service, and a desire by some operating companies to provide maximum flexibility in the use of cars by arranging each for independent operation.

For single-car operation there has also been a considerable tendency toward the removal of the customary platform circuit breaker and the installation of some form of line switch under the car. This practice may be attributed to the almost universal elimination of the bulkhead in car body construction, which makes the presence of the common type of platform circuit breaker very undesirable.

The use of field control for motors in city service does not seem to be a favored practice, as its use involves slightly additional complication. For a combination of city and suburban running, however, this type of control is considered of substantial advantage.

The foot control equipment developed on the Third Avenue Railway in New York to give the car operator simultaneous control of both air-brake valve and car controller by the operation of a foot pedal is an interesting arrangement. This equipment has the advantage of allowing the car operator to have both hands free, but because the acceleration through the controller must be automatic, it has some limitations from the standpoint of flexibility in operation under congested city conditions. The six-motor train control developed in Pittsburgh is also an interesting departure. It was designed in order to carry a portion of the motor equipment necessary to propel a two-car train on the trailer. This construction has the advantage that the extra motor capacity necessary to haul the trailer is dropped when the trailer is disconnected from the train. The scheme was discussed in the Annual Convention Number last week.

The desire to use multiple-unit control equipment on low-floor cars has also led to the development of this type of control in a form suitable to be installed in cabinets within the car body or under longitudinal seat boxes, where it is both protected and easy of access. In this construction, the arc-breaking switches are located under the platform of the car. In the general design of control apparatus there has been a tendency to provide greater arc-breaking capacity due to the fact that the railway power distribution systems have become such large networks with so much power capacity behind them that a failure of the equipment on any individual car causes severe arcing.

Graphite Plug Method of Lubrication for Trolley Wheel Bushings

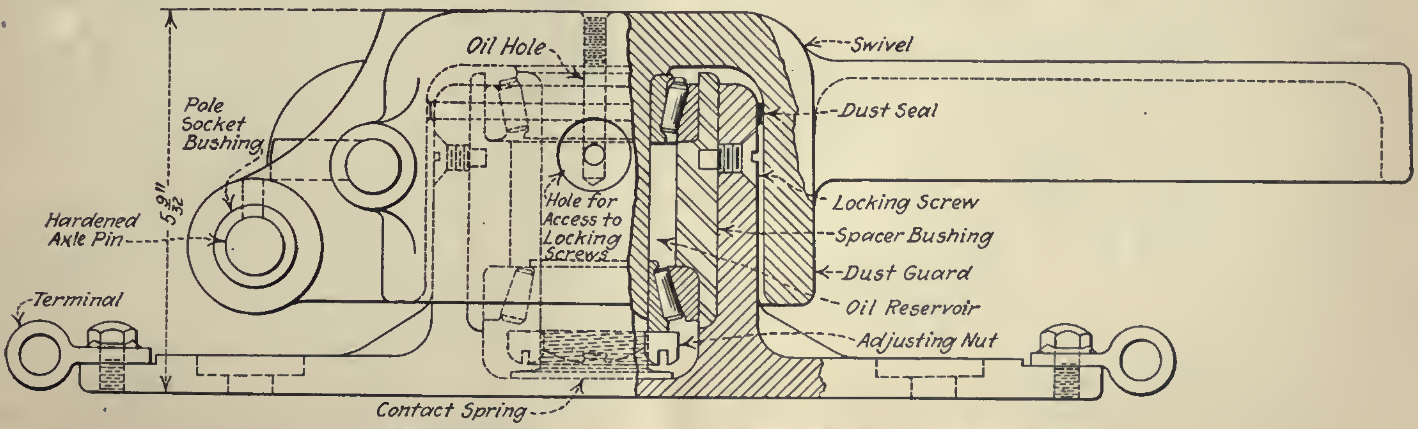
CURRENT COLLECTING EQUIPMENT

For some time there has been a feeling among railway operators that considerable improvement is possible in the design of the current collectors in common use. An attempt has been made to give the trolley wheel a longer life by increasing its diameter. This, however, has not been entirely successful because the increased weight at the end of the pole causes the wheel to jump farther away from the wire when passing under rigid overhead special work. Three diameters, 6 in., 5 in. and 4 in., seem now to be the most satisfactory sizes.

A Widely Used Type of Trolley Shoe

Damage to both wheel and wire results from excessive vibration with consequent arcing. Vibration, however, is largely a matter of balance and alignment, and improvement has been made in the balance of the wheel by means of greater care in the process of manufacture. A drop-forged copper trolley wheel is claimed in this respect to be superior to the ordinary cast wheel.

One of the outstanding problems in connection with the use of trolley wheels has been the lubrication of the bushing. In many cases the life of the wheel is determined by the life of the bushing. As a remedy for this difficulty, hollow, case-hardened steel, lubricated shafts, using a solidified lubricant, have given satisfaction on some railways. The lubricant inside of the bearing surface is fed to it automatically as required. Another remedy tried is the use of graphite plugs for lubri-

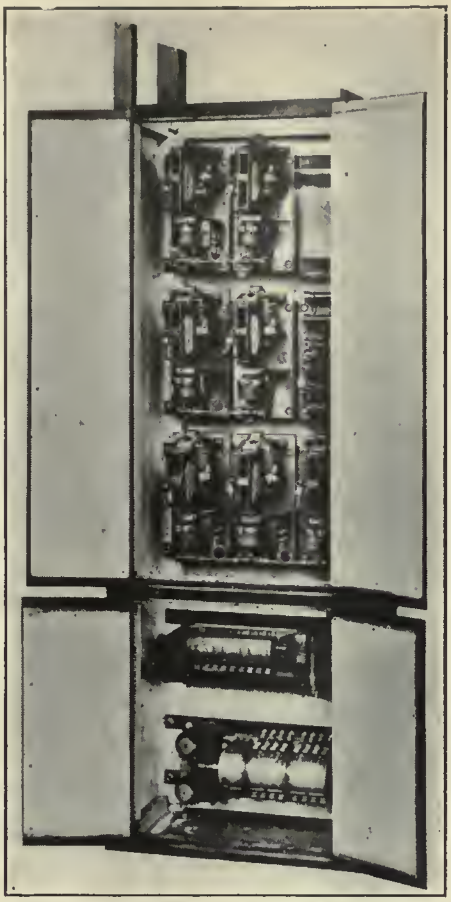


A Method of Application of Taper Roller Bearings to Trolley Base cation. These rest on springs, as shown in an accompanying illustration, and are thereby kept in contact with the bearing. Conical side bearings have been used as substitutes for the ordinary cylindrical bearing on one type of wheel.

A wheel with stationary flanges and a rotating tread has also been tried. It is claimed that this wheel will stay on the wire better than does a solid wheel, and the decreased weight and cost of the moving part are additional advantages. It has not, however, been widely adopted.

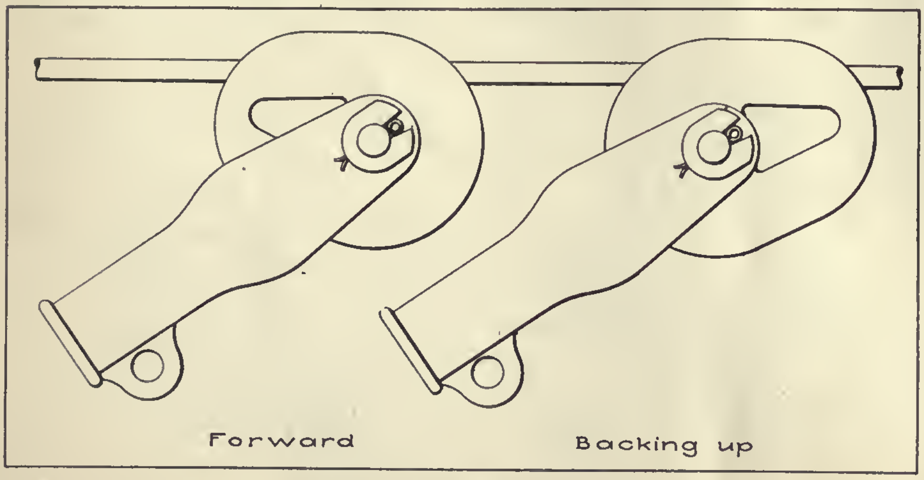
Generally speaking, trolley wheel performance becomes increasingly unsatisfactory as the speed increases. The solution of this problem has been approached from two general angles, the first consisting of an attempt to improve the performance of the wheels by the methods already described, and the second, through the development of sliding collectors.

Such devices have as their object the maintenance of a larger area of contact and the elimination of vibration caused by the rotation of the wheel. The designers have had to contend with several requirements, among which the most important are reliable operation through special work, avoidance of excessive wear on trolley wire, and provision for backing. The last of these requirements has probably been the most difficult to meet, although certain types of shoes now on the market are reported to have been improved so as to overcome this difficulty. Some railways maintain that sliding contacts may be used without noticeable wear on the wire. Others consider that an important requirement for the satisfactory operation of sliding contacts is the proper lubrication of the wire. It is important in this connection that the proper kind of lubricant be used and also that it be applied properly. Frequent application of very small quantities of lubricant gives better results than the application of much larger quantities at longer intervals. The requirements for a proper lubricant include adhesiveness and a minimum content of saponifiable material to prevent washing off the wire.



Modern Light-Weight Multiple-Unit Control for Surface Cars Arranged for Installation in a Cabinet in Car Body or on Platform

To insure that the trolley wheel will run true and also that there will be proper contact between the wheel and the wire, careful attention has been given to the design of the trolley base. The trolley pole should be free to move instantly in a vertical plane to accommodate changes in the height of wire, and should be equally free to swing in a horizontal plane to follow changes in wire alignment. A tapered roller bearing arrangement, shown in the accompanying illustration, has been designed for the purpose of obtaining better results in this direction.



A New Type of Sliding Trolley Shoe

In the equipment of one-man cars it has been a common practice to make the trolley base light in weight to correspond with the light weight of the other parts of the car. However, on one-man cars the service of the trolley base is even more severe than is ordinarily the case on cars of the larger types. Often the former is lower and therefore requires a longer trolley pole with a consequently greater tension. It is therefore the more general opinion now that the trolley base for both the small one-man cars and the larger cars have practically the same duties to perform and that there is no occasion for consideration of distinctive design.

A problem in trolley construction has been that of controlling the pressure on the wire as the pole changes its angularity for variations in the trolley wire height. Recent improvements in design have taken care of this requirement.

The trolley pole with either a wheel or shoe seems to represent the only practicable arrangement for current collection which will give satisfactory performance on the large majority of city and interurban properties which use overhead systems. This is primarily due to the nature of the existing overhead structure. The successful use of any form of pantograph or bow requires the equivalent of a catenary type overhead construction because of the inertia and rigidity of these forms of current collectors. In addition, the comparative first cost, weight and maintenance expense of the various devices materially favors the existing type of pole for most city and interurban lines.

Recent improvement in trolley catchers and retrievers consists mainly in provisions for oiling. While the trolley catcher is so simple that the question of friction really is secondary, nevertheless the addition of oil to moving parts simply increases the efficiency of the unit and decreases the amount of wear.

A Review of New York's Transit Situation

Conditions Getting Worse Daily—Yearly Growth Is Almost as Great as Entire Traffic of Buffalo—Mayor's Plan Would Disrupt the Present Rapid Transit Lines—Municipal Operation Means Waste of Money

By LeRoy T. Harkness
Member New York Transit Commission

The Author Brings Out that in New York City:

7,500,000 people are transported daily!

More than 700,000 ride in one direction in one hour!

Every day 2,500 more rides are taken than were taken the day before; 100,000 more a week; 150,000,000 more a year!

In general, population doubles every thirty-three years; traffic every twelve to fifteen years!

Last year the total traffic was 2,590,313,699!

In 1860 each person traveled forty-three times per year; in 1920 each person traveled 404 times!

In the past fifty years traffic multiplied nearly forty times; facilities increased only about five and three-quarter times!

In two years the ticket sales at Times Square Station increased 9,000,000!

The transit lines could carry 35,000,000 passengers in twenty-four hours—one-third the population of the United States! They actually carry 7,500,000 because most people travel in certain directions morning and evening!

EVERY day and in every way transit conditions in New York City are getting worse and worse.

Every day, on the average, there are 2,500 more travelers than there were the day before. Last year about 150,000,000 more rides were taken than were taken the year before. This means that an increase as large as the total traveling public of Rochester, Syracuse and Utica combined—156,488,293—is poured into our street railways every year.

These figures are so staggering we cannot fully grasp them. One hundred and fifty million is a big figure, but how big is it? By comparison it shows that the annual increase in New York is about three times the total yearly passengers in Albany (53,562,883), and approaches the total traffic in Buffalo (215,529,528).

In 1900 the first subway, costing about $50,000,000, was started, and put in partial operation in 1904. Nearly ten years were allowed to elapse before the Dual Subway plan of 1913 was put into effect, costing for construction and equipment about half a billion dollars. That project has been completed except for the Nassau Street line and the Fourteenth Street-Eastern line, both of which have been held up by adverse action of the Board of Estimate and Apportionment.

Again ten years have elapsed before the starting of new subways. We are continually making the same mistake of building a subway and then waiting till it is swamped before starting another. In the past fifty years traffic multiplied nearly forty times; facilities increased only about five and three-quarter times.

Finally, in August the Board of Estimate and Apportionment approved the routes and general plans of the Washington Heights extension in Manhattan and the Crosstown line in Brooklyn. The construction cost of these lines will be in the neighborhood of $60,000,000. This approval puts the Transit Commission in a position to drive forward the building of these lines, but unfortunately nearly five years must elapse before they can be constructed, equipped and put in operation. In May, 1922, the Transit Commission laid out a five-year building program to cost $218,000,000. This is the least that should be done.

The question immediately occurs, Where does all this tremendous traffic come from? Increases in population alone do not account for it. Traffic increases more than twice as fast as the population. It is the increase in population multiplied by the greater use people make of transit facilities.

The figures show this strikingly. The population of New York with number of revenue passengers on its urban transportation lines by twenty-year periods has been as shown in the table below.

It will be seen that in sixty years the traffic has multiplied about forty-five-fold, while the population has multiplied only five-fold. The population has grown from 18 to 39 per cent per decade and the traffic has increased from 49 per cent to 200 per cent, the high percentage following the opening of extensive new lines. In general, the population has been doubling about every thirty-three years and the traffic has been doubling about every twelve or fifteen years.

In 1860, on the average, each person rode forty-three times a year; in 1870 the average number of rides per capita increased to 103, in 1880 to 152, in 1890 to 218, in 1900 to 246, in 1910 to 321 and in 1920 to 404.

There must be considered too not only the increases in population and in the riding habit, but also the added difficulties of carrying people to and from congested districts. For example, the Equitable Building houses 13,000 people. It took a year and a half to build the Equitable Building, but it takes nearly five years to build a subway to carry its people to and from work. The 13,000 people, most of whom keep the same hours, are carried largely at the same time. A car in the subway will accommodate 130 of them and ten cars make up an express train, therefore it requires ten trains to carry the people who work in the Equitable Building. This is the full capacity of a two-track subway for twenty minutes.

Year	Population	Revenue Passengers
1860	1,174,779	50,830,178
1880	1,911,698	290,417,029
1900	3,437,202	846,353,058
1920	5,620,048	2,273,336,533

Entering into New York City's transit problem is also the number of visitors and commuters that come into the city. It is estimated in a recent report made to the Transit Commission that this amounts to more than 500,000 people a day. Nelson P. Lewis, formerly chief engineer of the Board of Estimate and Apportionment and now associated with the City Plan Survey of New York, estimated that in 1920 in the so-called Metropolitan District there was a population of about 9,000,000. The detailed estimates of prospective increases have not been completed, but Mr. Lewis' preliminary figure for this district for 1960—thirty-seven years hence—is 20,000,000.

The magnitude of this suburban traffic—present and prospective—amply warrants the work already initiated by the Transit Commission looking to the provision of separate adequate facilities for it. Competent advice is to the effect that both the Grand Central and Pennsylvania Terminals will be outgrown within the next seven years.

The Flatbush Avenue Terminal of the Long Island Railroad—the terminal of heaviest traffic of any two-track railroad in the world, is already outgrown. More than 34,000,000 passengers a year go through it.

FIGURES ON FUTURE TRAFFIC

We have considered the past growth. What of the future? In connection with various aspects of its work, the commission has had careful studies made of prospective traffic and has had the benefit of a careful survey made by the New York Telephone Company. These studies indicate a population of about 6,500,000 in 1927 and of more than 7,000,000 in 1932. Judging by the increases of the past the traffic in 1932 unless choked by lack of new facilities will be more than four billion passengers per year.

The traffic is already being choked. The 16,000 taxicabs that are crowding the streets and throttling surface traffic are an indication of the overflow from the transit lines of a considerable part of the public that would rather pay more and avoid the crowding.

Traffic congestion, especially on the rapid transit lines, has long passed the point of acute suffering. There is not only the physical suffering and menace to health, but the indiscriminate crowding of women and young girls on the transit lines in the rush hours is debasing and demoralizing. The whole situation is a disgrace to the city of New York.

At best it will take nearly five years before big trunk line subway systems can be placed in operation. The two lines—the Washington Heights extension and the Crosstown line—that the commission finally secured authorization to go ahead with a few weeks ago are only a beginning. They will only very partially keep up with the increased congestion. It is almost frightening to contemplate what must happen in the next four or five years before any major relief can be given. It is all very well to talk about traffic being reduced because of the choking effect of congestion. People, and more and more people, will try to crowd themselves on the transit lines. At the present time railroad operation in Greater New York is the most intensive operation anywhere in the world. Comparatively little can be done to add to the service that is being given. Tracks in the rush hours are crowded very nearly, if not quite, up to the limit.

These are some of the things that may help, although it must be recognized that anything but major subway construction is merely a palliative:

The engineers of the Transit Commission are already preparing plans for the lengthening of local station platforms both on the Interborough and B.-M. T. Lines. This will substantially increase the local service, and as the congestion gets worse more people may be content to take a little longer time and ride on local trains, thereby relieving the worst crowding, which is on the express trains.

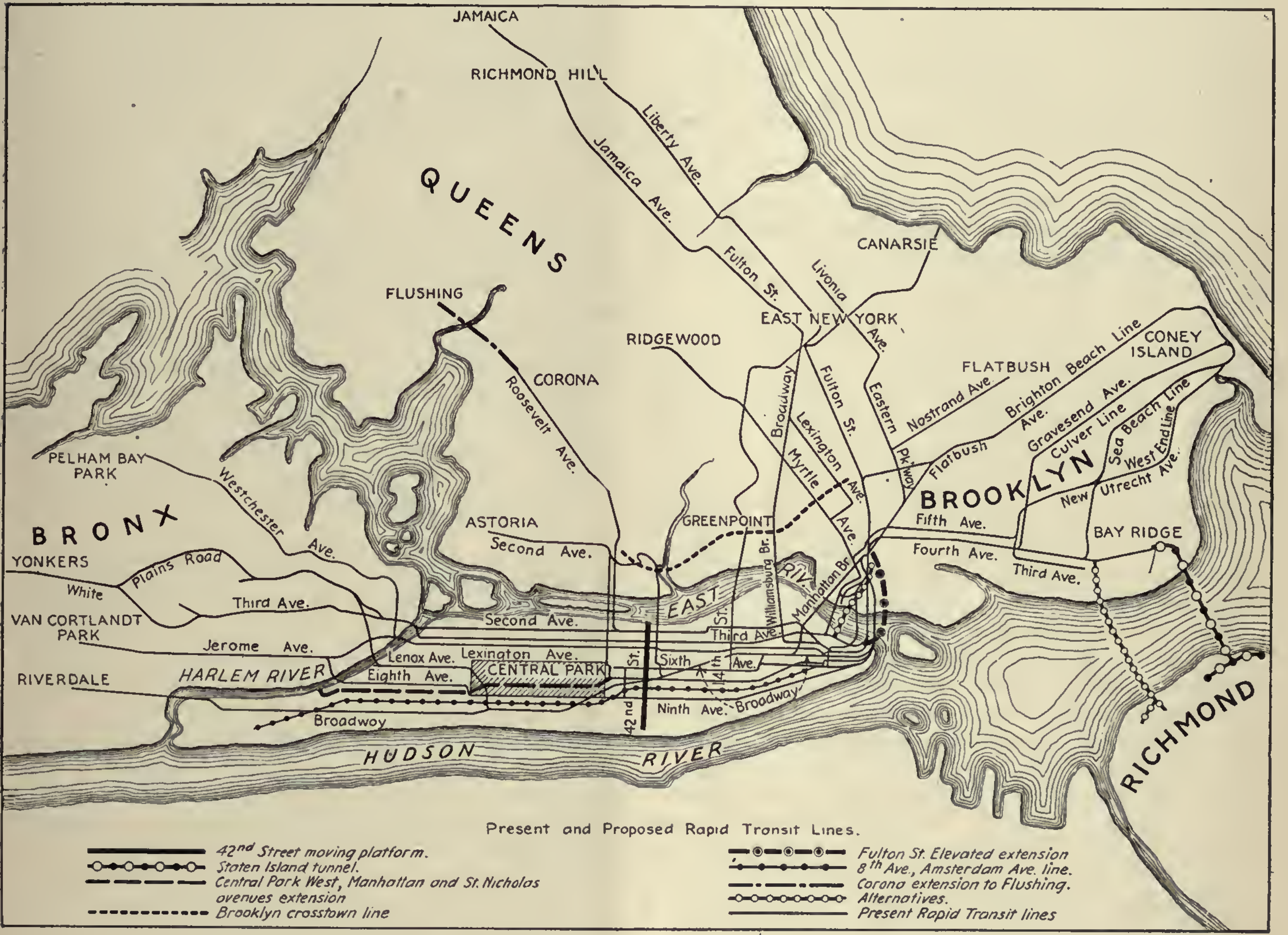
Both subway companies have been ordered to buy more equipment, and large additional orders will probably be placed in the near future. The Interborough company claims that it has been prevented from keeping the present equipment in first rate order and from getting more cars because of the alleged failure of the city authorities to carry out the contract obligation to provide inspection, storage and repair facilities.

Ten years ago the city agreed to build the Nassau Street line, extending from a connection with the Center Street loop at Chambers Street down Nassau and Broad Streets to the Montague Street tunnel. Construction plans, specifications and contracts were prepared by the Transit Commission at large expense for this work, only to have them rejected by the Board of Estimate and Apportionment. The construction of this line would give very material relief to the whole Brooklyn transit operation.

Similarly in 1913 the city agreed to build the Fourteenth Street-Eastern line, extending from Fourteenth Street and Broadway to East New York, and the work on the subway portion was actually started in 1916. When the commission came into office the subway work was largely completed, but it was only after many months that it was able to secure authorization for the contracts for station finish and trackwork. Nor is this all. The subway portion of the line only goes a short distance in Brooklyn and will serve a comparatively limited population. The great service of this line is to reach the population further out toward East New York and the districts beyond East New York served by existing elevated railroads. At the present time these people are being brought by a roundabout way over the Williamsburg Bridge and down through the Center Street loop, where they must change and walk two blocks—most of them on the street surface in all sorts of weather—to reach the Broadway subway. It is without exception the most acute and potentially dangerous situation on any of the transit lines.

The completion of the Fourteenth Street line from East New York will take these people on practically an air route to Fourteenth Street and Broadway, where most of them will be within easy walking distance of where they want to go. The operating contract and the route and general plan which have previously been approved by the present Board of Estimate and Apportionment and the Mayor call for an elevated railroad, practically all of which is over an old right-of-way of the Long Island Railroad on which freight trains are now being operated. The Transit Commission rushed forward plans for this elevated extension in accordance with the provisions of the contract with the operating company, secured bids and submitted them to the Board of Estimate and Apportionment about a year and a half ago. That board rejected the bids on the ground that although the city was bound by a contract to build this elevated line the board now preferred a subway. The operating company, on the other hand, stated that the substitution would mean several years more delay and a continuance of the acute condition at Canal Street and insisted upon a compliance with the terms of its contract. The matter has therefore stayed at a deadlock and the commission has been unable to get this line under way. It could be built in about eighteen months, would relieve the most acute condition in the city and would give the greatest single measure of relief that could be given anywhere within so short a time.

But it would seem that all these things, important as they are, will fall far short of relieving a situation that is bound to grow worse until the new subways come in. There is one method that is drastic, but in my judgment will very likely have to be availed of. That is what is called "staggering the peak," or, in other words, regulating the hours at which people go to and come from business. At the present time the bulk of the traffic is compressed within two hours morning and evening, 700,000 passengers being carried in one direction in one hour. Great relief can be occasioned if by statutory enactment or otherwise it were required that people in certain businesses should start and leave half an hour later or half an hour earlier, as the case might be. This would spread the peak over three hours instead of two, greatly reduce the crowding and at the same time permit carrying a greater traffic. The difficulty is to get the public to do this voluntarily. Such a system was put in operation during the influenza epidemic under plenary Health Department authority. It worked well then. I think we will have to resort to it again.



Present and Proposed Rapid Transit Lines in New York City

There are two main things to be done, and fortunately on these the ground work is well advanced. The first is the reorganization, combination and rehabilitation of existing lines, so as to enable them to give the maximum of service. The commission's plan for readjustment of the existing conditions has been made public* so need not be repeated here.

The Interborough company has already been reorganized and saved from a receivership. The old B. R. T. (now the B.-M. T.) after several years in the hands of a receiver has recently been reorganized and put in solvent condition. The plan and scope of these intermediate reorganizations were largely influenced by the Transit Commission working in close co-operation with Judge Julius M. Mayer of the United States Circuit Court of Appeals. Hence, both companies are now so organized that the Transit Commission's plan for the municipal ownership and unification of all the useful properties in the city can be carried out.

There is one vital point that must be kept in mind in all subway discussions and which is the base of the commission's reorganization plan: The state Constitution limits a city's borrowing power to 10 per cent of its assessed valuations. New York city is always nearly, if not quite, up to that limit. There are certain exceptions to this constitutional provision, notably the one affecting subway bonds. Subway borrowings may be exempted from the debt limit if the bonds are self-sustaining. The first subway built in 1900-1908 is self-sustaining and nearly $50,000,000 expended on it was exempted and used over again. The 1913 transit program, in which the city has invested nearly $250,000,000, is not self-sustaining and the money invested represents a frozen credit. Over $10,000,000 a year for interest and sinking fund payments are now included on this account in the tax budget. The crux of the commission's plan is to make the transit lines at all times self-sustaining so that nearly $250,000,000 can be released for new subways. This will constitute a revolving fund and will finance more or less automatically all needed future extensions. It will allow what we have long so badly needed—a consistent, continued building policy of putting forty or fifty million dollars' worth of construction under contract every year.

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*See ELECTRIC RAILWAY JOURNAL, Oct. 1, 1921, page 557.

Furthermore, and in passing, one myth ought to be disposed of—that of the 5-cent fare. We have not in reality a 5-cent fare in New York today; it is 6 cents. The abolition of free transfers during the disintegration of the surface lines has added just about 1 cent to the fares paid by the riders on those lines through either an added fare or a 2-cent charge for transfers. On the rapid transit lines the passenger pays 5 cents and the city pays 1 cent out of taxes. The 5-cent fare has not been saved—it has merely been camouflaged. The Transit Commission reorganization plan is the only constructive suggestion yet made for its restoration.

NEW SUBWAYS THE ONLY SOLUTION

With regard to new subways:

The only solution of the problem is the building of new subways on an enormous scale. More than a year ago the Transit Commission outlined a plan that would take five years to carry out at a cost of $218,000,000. Seven lines in all were proposed.

After the Transit Commission had adopted these plans the Mayor of the city made public a so-called subway plan extending over a period of fifteen years. This included a description of various map or paper routes all over the city and called for the recaption of the lines built by the city under the 1913 subway program and leased to the Interborough and B.-M. T. companies, the contracts providing that those lines could be taken back at any time after ten years upon the city paying the companies the amounts of their investment plus 15 per cent.

The Mayor's plan called for an expenditure of more than a billion dollars, but without the slightest trace of any plan for financing the cost. Furthermore, the layout of the lines violated fundamental rules of engineering and in the face of the need for utilizing every available agency to meet the enormous increases of traffic the Mayor urged a plan that would split apart and disintegrate the present system.

The Board of Estimate and Apportionment turned down the commission's subway plan without ever officially giving a reason. Thereafter, and for a number of months, the attention of the city board and certainly that of the Mayor was concentrated on attempting to get legislation abolishing the Transit Commission, turning all the powers of the commission, including that of regulating service, rates and capitalization of transit companies, over to a city board and giving the city the power to engage in municipal operation of all transit facilities. As soon as the Legislature adjourned the commission, in a final effort to secure action, slightly modified two of its routes—the Washington Heights extension and the Crosstown line—to agree as nearly as might be with two of the Mayor's routes. After repeated requests the Board of Estimate finally appointed a conference committee, presided over by Dock Commissioner John H. Delaney, who had been Transit Construction Commissioner and thereby had a thorough knowledge of transit matters. The conference finally led to the approval of these two routes and the commission is now in position to drive forward the construction plans, contracts and specifications, and as soon as completed to submit them to the Board of Estimate for the necessary consents and appropriations.

MAYOR'S PLAN MEANS DISINTEGRATION

The Mayor's plan, or, more properly, the theory underlying it, requires more extended consideration. The paper maps or routes included in it are of themselves relatively unimportant except as they are founded upon the principle of disintegration. One route or another, if based on fundamental engineering considerations, should readily be adjusted with another route or routes. The Mayor, however, proposes in the first place to recapture such of the existing lines as are recapturable. By recaption is meant the right retained in the 1913 subway contracts for the city to take back the new lines at any time after ten years by paying an amount which at the tenth year equals the company's investment plus 15 per cent and decreases by 1/39 part each year thereafter. But only part of the existing rapid transit system—to say nothing of the surface lines—is subject to this right. The first subway built under the 1900-1902 contracts is not subject to it. Neither is the Manhattan Elevated system nor the company-owned elevated and rapid transit lines in Brooklyn.

This would be the result of the adoption of such a policy and it needs to be carefully considered by the citizens of New York because all signs point to a determined effort on the part of the present city administration to carry it out.

In the first place it would cost something over $180,000,000 in payments to the Interborough and B.-M. T. under the terms of the contracts. This would be an actual cash outlay out of the city treasury and would not add a single seat nor a single strap.

So much for that. Now to consider the disintegrating effect:

In 1913 the city extended the old subway line on the east side of Manhattan south of Forty-second Street north into the Bronx by building the Lexington Avenue extension. Similarly, on the west side it extended the old Broadway line south of Times Square to downtown Manhattan and Brooklyn by building the Seventh Avenue extension. The subway contracts provide for "swapping" one of these new extensions for one of the old lines. That would mean that transfers or connections from one line to the other would be cut off. This would also do away, in large part at least, with the joint service in the Bronx whereby Manhattan Elevated trains operate over the subway extensions.

In Brooklyn a great part of the transit relief under the 1913 program was furnished by linking up new subway lines with existing lines such as the Brighton Beach and Sea Beach lines already owned by the Brooklyn company. The city cannot recapture these old company lines and the recaption of the new lines would mean the breaking apart of the present joint operation. Thousands of passengers coming in over the Brighton Beach line would have to transfer at Malbone Street in Flatbush and pay an additional fare to go over the Broadway line. A similar situation would be the case with the Sea Beach service at about Fourth Avenue and Sixty-fifth Street. So also the tremendous traffic coming in over the Broadway Elevated in Brooklyn would be deprived of the present free transfer to the Broadway subway in Manhattan.

The purpose of this part of the so-called plan is not to give transit relief, because it will not give transit relief. Recaption of the existing lines in and of itself will not add a single new facility, but on the contrary will disintegrate and interrupt the existing avenues of traffic and multiply the number of additional 5-cent fares. The underlying purpose patently is to get possession of a part of the rapid transit system so that it can be municipally operated.

Expressing it briefly, the difference between the Transit Commission's plan and that of the Mayor is:

The commission believes in eliminating existing abuses of private operation, reorganizing, combining and rehabilitating present lines and utilizing every available agency to meet the present traffic congestion and the enormous increases that are indicated for the future. The Mayor's plan is bent upon splitting apart the existing lines and entering upon the field of municipal operation on part of those lines even though that spells disintegration and additional fares.

The commission laid out a conservative plan for the expenditure of $218,000,000 in five years, and provided the way, through its reorganization plan and the exemption from the debt limit of the present investment, for adequately financing this project and all future ones. According to his estimates the Mayor's plan calls for the expenditure of about $900,000,000 for construction over a fifteen-year period. Estimates of the commission's engineers—the men who have actually built the New York subways—show that the bare construction cost would be at least $1,150,000,000. With municipal operation the city would have to spend scores of millions of dollars for equipment for these new lines. No provision has been made in the estimates for this. In addition the Mayor's plan contemplates paying out of the city treasury to the transit companies for recaption an amount in the neighborhood of $180,000,000. If it were possible to carry all this out in toto it would probably entail an expenditure in the neighborhood of a billion and a half dollars. To provide for this absolutely unparalleled expenditure there is no financial plan except as the city administration might expect to fall back upon the ordinary annual accretions to the debt limit. As a matter of fact these are altogether insufficient to meet either the commission's or the Mayor's subway projects, and are practically taken up by the normal increases in city functions such as schools, streets, paving, sewers, and the like.

Recently, the Comptroller officially reported the present debt limit to be about $76,000,000. This, however, did not take into consideration $60,000,000 for the Staten Island tunnel or the cost of various other projects.

PROPOSED STATEN ISLAND TUNNEL A WASTE OF MONEY

Before leaving subway matters, there is one instance of the city's activities that I cannot forbear referring to. Under a separate act of the Legislature passed in 1921 the Board of Estimate has gone ahead with a project to build a tunnel to Staten Island. This is laid out as a combination freight and passenger tunnel, and in this respect it conflicts both with the plans of the Port Authority and of the Transit Commission. The Board of Estimate and Apportionment is already letting contracts for this work, and the cost is estimated at $60,000,000. It does not fit into the complete scheme outlined by the Port Authority for freight development and as laid out would only connect for freight purposes with the Baltimore & Ohio Railroad. No contracts have been let for this operation and so far as freight is concerned if and when the tunnel is completed the city will practically be at the mercy of the railroad companies in fixing the terms of the lease. So far as transit operation is concerned this tunnel is a complete misfit. To allow for freight operation the grades of a tunnel have to be in the neighborhood of 1 per cent, while for transit operation they may be in the neighborhood of 3 per cent. Stated concretely, this means that the present tunnel has to be so deep at the shore line of Staten Island that access to it can be only through deep elevators, and the railroad only rises to the surface away in the center of the island. Therefore it conflicts with well-considered plans both from the standpoint of freight and transit development.

The Transit Commission's plans for Staten Island contemplate a tunnel that would rise near the shore lines both of Staten Island and Brooklyn and readily connect with existing lines in both boroughs. The city, however, is committed to going ahead and spending $60,000,000 on this project. For this amount of money the Transit Commission could not only provide a proper and adequate rapid transit tunnel to Staten Island but could revamp and rebuild the existing transit lines within that borough so as to give the whole island as good transit service as there is in the city. The spending of $60,000,000 or more on this ill-conceived project represents to my mind the grossest waste of public funds that I have seen in an experience of over twenty years in municipal affairs.

> "ALL the studies made by the commission indicate that in congested districts street cars are more effective in moving large numbers of people than are buses when consideration is given to variations in weather and other conditions. The proper field for buses is to take the place of some of the trolley lines outside the congested areas and generally to serve the outlying districts as feeders for rapid transit and other lines."—*Commissioner Harkness.*

PRESENT BUSES NOT MUNICIPALLY OWNED

Finally, with regard to surface lines and buses:

It has been popular in certain quarters to refer to the surface systems as antiquated and obsolete. The truth of the matter is that they carry about 40 per cent of the travel of the greater city, 57 per cent in Brooklyn, and large districts, especially in Brooklyn, are absolutely dependent on them.

New York has had for a number of years an exceedingly well-managed bus line operating on a 10-cent fare —that of the Fifth Avenue Coach Company. Several years ago, at the time of the Brooklyn transit strike, one of the city departments arranged as an emergency measure to put a number of buses in Brooklyn along the lines paralyzed by the strike. These were buses operated by individual owners and supervised by a city department. This marks the start of the so-called municipal operation of buses. After transit conditions returned more to normal, injunctions were obtained against the continued operation of these buses, and generally they were withdrawn from Brooklyn. During the early days of the receivership of the New York Railways the receiver discontinued operation on several crosstown lines, and these buses were put in to take their places. They bear on their sides the words "Department of Plant and Structures," but in reality are not owned by the city, nor by that department, but are owned by individual operators.

At about the time of starting this bus operation the Board of Estimate and Apportionment passed a blanket resolution authorizing the Commissioner of the Department of Plant and Structures to grant permits to individual owners of buses. The city Charter lays down in detail the procedure that must be followed in granting rights to use city streets, and the public service commission law requires that in addition a certificate of convenience and necessity must be obtained from the Transit Commission. No attempt was made to comply with these statutory requirements, and in the litigation that ensued the Supreme Court of the state of New York repeatedly held this bus operation to be illegal.

> "FURTHERMORE, and in passing, one myth ought to be disposed of—that of the 5-cent fare. We have not in reality a 5-cent fare in New York today; it is 6 cents. The abolition of free transfers during the disintegration of the surface lines has added just about 1 cent to the fares paid by the riders on those lines through either an added fare or a 2-cent charge for transfers. On the rapid transit lines the passenger pays 5 cents and the city pays one cent out of taxes. The 5-cent fare has not been saved—it has merely been camouflaged. The Transit Commission reorganization plan is the only constructive suggestion yet made for its restoration."
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> —*Commissioner Harkness.*

In the fall of last year the commission conducted an extensive investigation into this bus operation and found it honeycombed with politics and what a local politician once termed "honest graft." For example, permits were quite generally given on the recommendation of district leaders, bus drivers were laid off for not voting, and an old-time partner of the head of Tammany Hall known as "Fish-hooks" McCarthy was given bus permits on the Eighty-sixth Street "cream" line on a telephone request. On one of the lines in the Bronx it was proved beyond question that two local politicians were drawing down two-thirds of the profits on a line operating on a 15-cent fare, for which they had done nothing but obtain the permit. When these situations were called to the attention of the Commissioner of the Department of Plant and Structures, while on the stand before the commission, his answer was that he was not interested "so long as they were Democrats."

Finally a suit for injunction was started by one Schafer as a taxpayer based not on the illegality of the actions of individual bus operators but based upon the broad ground of the illegality of the action of public officials in authorizing and continuing this wildcat system. A decision in Schafer's favor was handed down by Justice Mullan in the Supreme Court last summer and the commission intervened and asked for and obtained a stay while it was investigating the matter. An appeal was taken to the Appellate Division, which affirmed the decision of the court below. Subsequently an application was made by the city authorities for leave to appeal to the Court of Appeals. This leave has recently been denied by that court, and it is this last decision that has brought the bus situation to a focus.

Immediately upon learning of the decision of the Court of Appeals the Mayor called a meeting of the Board of Estimate and Apportionment and resolutions were adopted asking the Governor to call an extraordinary session of the Legislature to authorize the city to spend $25,000,000 for buses and to engage in the business of municipal bus operation.

There has been no need for a special session. The matter of municipal bus operation is a large public question that should thoroughly be thrashed out and decided at a regular session. On the merits it is very simple and easy to hold the matter in abeyance until after the Legislature meets in regular session next January. All that is required is for the Board of Estimate to act in accordance with the provisions of the Charter and grant rights which will expire by their own time limit at the end of, say, six months. On the basis of such action the Transit Commission is prepared promptly to give its certificates of convenience and necessity. The grants by the Board of Estimate may be either to the individual bus operators or to associations of them, and they may contain such terms, conditions or requirements as that board sees fit to impose. One term it must impose under the Charter: That the bus operators shall pay compensation to the city. The Fifth Avenue Coach Company is required under its grants to pay the city 5 per cent of its gross receipts, which amounts to about $250,000 a year. Under the illegal operation that has been carried on the city has not received a cent, and in addition has spent considerable money for salaries of starters, superintendents and the like.

This very significant fact should be kept in mind: The demand for an extraordinary session on the so-called bus emergency is not for the purpose of maintaining the *status quo* or to keep the present small operators going. The demand is for authority to spend $25,000,000 of city money for buses and to engage in municipal bus operation. This does not mean a continuance of the present condition but a substitution for it. The present bus operators are to be put out of business and their places taken by municipal buses and municipal employees.

BUS COSTS AND FIELD ANALYZED

It has been blithely assumed and promised that the $25,000,000 municipal bus system would pay on a 5-cent fare. So far as I have ever been able to ascertain no real study has been made by the proponents of the plan to find out if this is so. True, the present wild-cat bus operation is on a basis of a 5-cent fare, but in that case nothing is paid to the city and there are no maintenance and depreciation reserves, and the commission's counts indicate a degree of overcrowding and a condition of equipment that would not be tolerated in normal operation. On the contrary, the Fifth Avenue coaches are well run and the whole property is efficiently managed. The plain fact of the matter is that on a basis of efficiency and thorough maintenance and repair the cost of operation takes more than 8 cents out of every 10 cents collected by the Fifth Avenue Coach Company. Investigations conducted by recognized experts employed by the commission of conditions not only in New York but in other cities in this country and abroad indicate that in general 3½ miles is the maximum distance that a bus can profitably be operated on a 5-cent fare.

Buses have their part in any modern transportation system and an important part. The trouble with the surface lines in New York in large part is due to their being throttled. To render good service and make money a surface car must move at a fair rate of speed. Broadway, for example, has the lowest mileage per hour of any surface system I know of—less than 5. The remedy for the present ills of surface transportation in New York are those indicated by the Transit Commission some time ago. It proposes to eliminate a considerable part of the present track mileage as being no longer necessary and to straighten and improve the existing routes. This would leave certain streets free for vehicular traffic and give the streets on which trolleys are retained the right of way for railroad purposes. The provision of additional streets wholly for vehicles would fill a great need. On the streets reserved for railroad purposes parking of cars should be prohibited at least during rush hours. By this means and through greater care in letting the cars through on cross streets the schedule speed should very materially be increased. This in turn would draw considerable traffic because if we could go uptown in a surface car at a reasonable rate of speed we would greatly prefer doing that to going down into a subway or climbing up onto an elevated.

All the studies made by the commission indicate that in congested districts street cars are more effective in moving large numbers of people than are buses when consideration is given to variations in weather and other conditions. The proper field for buses is to take the place of some of the trolley lines outside the congested areas and generally to serve the outlying districts as feeders for rapid transit and other lines.

Co-ordinated Train and Motor Bus Service in Boston

Owing to the Short Local Hauls and Congested Streets in Malden, the Boston Elevated Is Proposing to Operate Trolley Car Trains with Distributing Lines of Buses Instead of Individual Trolley Cars—If Successful, the Plan May Be Extended to Other Localities

By Edward Dana

General Manager Boston Elevated Railway

THE story of the motor bus as it is unfolding in the territory of the Boston Elevated Railway may be of interest generally.

On July 1, 1918, when the Commonwealth of Massachusetts assumed the direct operation of this large system, there were no competitive motor buses in the territory. This vehicle, which had insidiously worked its way across the continent from the California coast, leaving in its trail suffering street railway systems, had played no part in the difficulties which led to the public operation of the Boston Elevated.

Under the 1918 act, the Elevated was required to be operated on a service-at-cost basis and fares were increased. On July 10, 1919, a flat 10-cent fare had been reached. This flat fare was accompanied by a substantial decrease in revenue passengers, even though the fare was sufficient to prevent deficits and cover the full cost of service.

Naturally, there has been some discussion and advocacy of competitive buses, but the assessment against the taxpayers of $3,980,151.67 for the first year's deficit under public operation and the fact that this amount had to be repaid before fares could be decreased had a very real effect upon those in authority by whose action motor buses could be permitted.

The consequences of the act were understood by most municipal officers, and it was realized that if competitive motor buses were permitted and the revenue of this great system diminished one of three things must occur under the laws:

First, an increase in fare above 10 cents to offset the loss, or

Second, additional deficits against the taxpayers, or

Third, loss of service in the district affected, in an effort by the state trustees to localize the competition and place no burden upon the system as a whole which might result in a higher fare or a tax assessment.

The result was that cities and towns refused licenses to competitive jitneys with the single exception of the city of Malden. Here the indignation because of the 10-cent fare was apparently greatest and an appreciation of the economic requirements of the act was apparently the lowest.

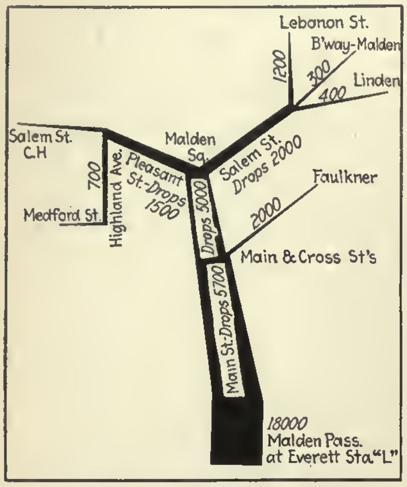
In the light of what has occurred it almost seems as if Malden was destined to be the scene of the final solution of the problem both in Malden and in other cities outside of Boston served by the Elevated, to the end that it shall be satisfactory to all.

COMPETITIVE BUSES IN MALDEN

On June 18, 1919, competitive buses were authorized in Malden paralleling one of the main street railway lines. The state board operating the Elevated took no action, chiefly because as a state board, operating according to a specific act, it could not act from the same motives as a private railway. It was necessary to have an actual loss of revenue and a consequent burden to place upon the rest of the system before measures could be taken.

During this period it became a certainty that the 10-cent fare was sufficient to prevent any further deficit on the Elevated system, and it likewise became possible to work out a local fare of 5 cents for those whose rides were so short that they had ceased to ride and thus secure full enjoyment of the facilities of the system. As is now generally known, this has been accomplished, so that now 100,000,000 passengers a year, representing 26 per cent of the total revenue, are carried for a 5-cent fare, and the average fare has been reduced to 8.7 cents.

By the irony of fate, the most ideal location to install this local fare zone scheme existed in Malden. Hence it was tried there without any intention of driving out the jitney, because it was evident that the frequency of the jitney service on a very short haul could not be combated by necessarily less frequent trolley service, whatever the fare.



Traffic Distributes Rapidly in Malden. It Is Logically a Bus Problem

Then followed an attempt covering many months to have the authorities and the car riders understand that there must ultimately be a choice between trolley and motor bus in any situation in which their competitive service resulted in loss of revenue.

After some feeling and a change in the Board of Aldermen by an election in which jitney competition was the chief issue, the approval of a license granted to the private jitney came before the Mayor for approval. The Mayor vetoed the license upon broad grounds, and very shortly thereafter two lines of motor vehicles were in operation by the Boston Elevated Railway as feeders. Apparently the present service has met requirements and has proved satisfactory to the traveling public.

At the present time the question of rebuilding the street in the heart of the city of Malden has brought up the desirability of removing the car tracks from an already overcrowded main business thoroughfare. The local authorities, the executive committee of the Chamber of Commerce and other substantial citizens intent on broad planning for the future have been in conference with the Elevated and appear to favor the plan which is here described.

THE MALDEN PLAN

The chart of the Malden lines shows that they converge through Malden Square and reach the Everett Terminal of the Elevated trains via Main Street.

The traffic flow chart also indicates the volume of traffic concerned. It is interesting to note that a daily load of 18,000 in each direction at the terminal in Everett is reduced at Malden Square to only 6,000. The distribution of these reduced numbers from Malden Square by several trolley lines to comparatively near-by territory is conducive to inefficient operation and lack of flexibility.

It is for this reason that consideration was given to a plan for the operation of trolley car trains from the Everett Terminal of the Elevated to a terminal at Malden Square and the distribution of the traffic at this point by means of several frequent bus lines to the originating and delivery territory of these car riders. The plan at present under consideration is shown in the accompanying diagram.

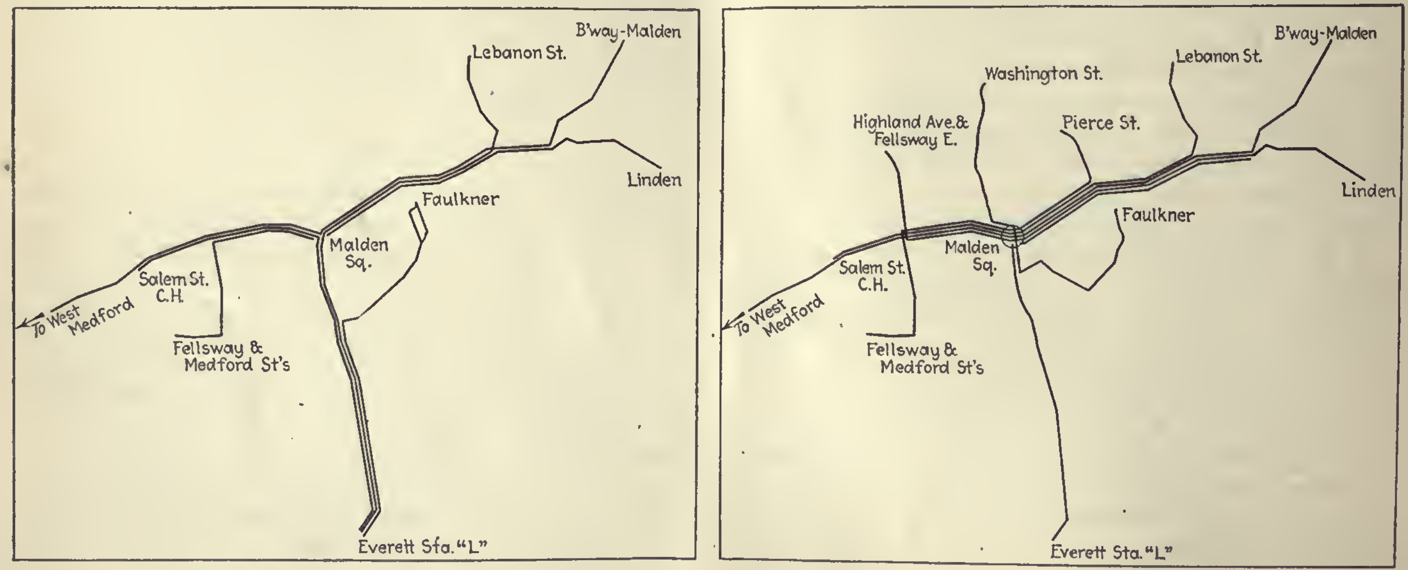
Theoretically, such a plan is fundamentally sound from several points of view. In the first place it permits by trolley trains the best possible service both as regards quantity and regularity where the traffic as indicated in the flow chart is the heaviest.

Secondly, it permits a convenient distribution of a relatively light traffic into the originating and delivery district of the rider by short, frequent bus lines.

It would appear, therefore, that at no greater cost to the car rider a much improved transportation service could be rendered and the abandonment of many trolley tracks would solve the street traffic congestion problem in the heart of the city.

The state board operating the Elevated has signified its readiness to proceed with such a plan. Whether it actually becomes an established fact in the near future will depend upon the degree of confidence which is accorded the plan by the community concerned.

Such a plan in successful operation would most certainly mark a step forward in the co-ordination of bus and trolley and be followed by similar arrangements elsewhere.



The Routes at the Left Show Present Car Lines—Those at the Right the Proposed Substitute, i. e., Train Line to Malden Square and Bus Service from that Point

What the 5-Cent Fare Means in Jersey

More than 150,000,000 Passengers in the Larger Municipalities Get Reduced Rate Under Public Service Railway's New Plan—Success Will Depend Upon Increased Traffic

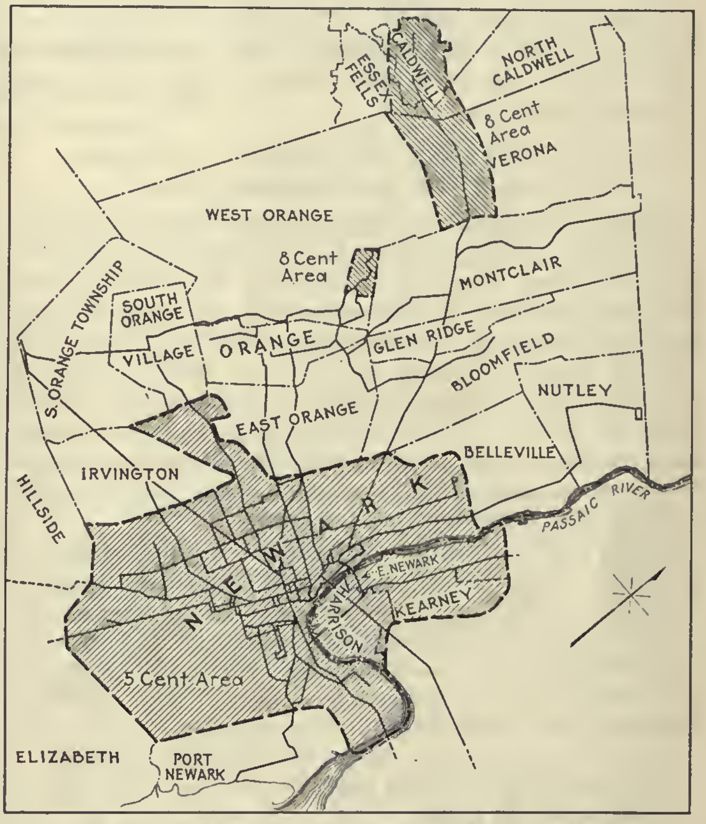
A NICKEL fare on a new basis is in effect for local rides in the more populous communities of New Jersey, in accord with the schedule of rates put into effect on Oct. 1 by the Public Service Railway. The new fare is the result of a proposal made on Sept. 25 by the Board of Public Utility Commissioners, and accepted on Sept. 27 by the company, as told in ELECTRIC RAILWAY JOURNAL for Sept. 29. In general the plan embraces a 5-cent fare for any continuous ride within the city limits of Newark, Jersey City, Paterson, Elizabeth and Camden, with an additional 5-cent charge to the end of the previous single-fare limits. Beyond these the 8-cent fare continues in effect. No transfers are issued in the 5-cent areas.

The inauguration of this plan in New Jersey makes the Public Service Railway the largest property, in point of mileage, now operating with a 5-cent base fare. The present arrangement is to be tried for four months unless sooner terminated by joint agreement between the company and the Utility Commission. How successful the scheme will be cannot be foretold with accuracy yet, although it is obvious that there must be a large increase in the number of short-haul passengers if the plan is to produce as much revenue as did the old fare. During the year 1922 the railway carried 325,000,000 passengers, of whom about half traveled in what are now the 5-cent areas. The new fare therefore means a reduced rate for more than 150,000,000 riders. Partly offsetting this decrease in revenue there will be the gain from those who travel to points outside the city boundaries and pay 10 cents instead of 8 cents.

EFFECT ON RAILWAY REVENUE CANNOT BE PREDICTED

Uncertainty concerning the outcome of the experiment is due chiefly to the presence of the hundreds of buses which operate on the same streets as the trolleys. In some cases they are giving a longer haul for 5 cents than the railway is doing under the new rate. But in other cases where the bus fare has always been more than a nickel, the trolley may henceforth have the advantage. There is also some question about the effect of the present routing, because buses in a number of instances make through trips which can be made on the trolley only by transferring.

Traffic conditions vary greatly in different parts of the state, due in part to local geographical features, and in part to the peculiarities of bus competition. The railway system is divided into six operating divisions, and the new plan has had to be adapted to fit the needs of each case. In the Bergen division there are no large towns or cities and no 5-cent areas. Existing rates of fare will continue practically without change.



In Essex the Distance from the Center of the City to the End of the 5-Cent Area Varies from 2 to 4 Miles

The most important of the six railway divisions is Essex, which includes the cities of Newark, East Orange and Orange, as well as numerous suburban towns and villages. In a general way the trolley lines radiate from the center of Newark to the surrounding communities, although there are also some crosstown lines. The 5-cent area includes nearly the whole of the city of Newark, as shown in the accompanying map, as well as Harrison and part of Kearny. An exception had to be made in favor of these towns because they lie so close to the heart of the city, being separated from it only by the Passaic River, that the mileage of a trolley trip to reach there would be too short for a double fare. Two fares will be charged for the trip to Port Newark as has always been the case.

All other towns in the division lie in a second 5-cent zone, except those at the extreme end of the Bloomfield line. This route is the longest running to the west, and has a third zone, in which the fare is 8 cents, at the end of the two 5-cent zones. The through fare from Newark to Caldwell thus becomes 18 cents instead of 16 cents (or 15 cents in tokens). The short Eagle Rock line will continue to collect an 8-cent fare because of its difficult operating conditions.

On the majority of the bus lines in Essex the fare is 5 cents, and in many cases the fare limits coincide with the new railway zone limit. Trolley and bus will be on a basis of approximate equality so far as length of ride and fare are concerned to Harrison and Kearny, to North Newark, Forest Hill, Roseville, Vailsburg, Hillside and Elizabeth. On the Bloomfield line the 5-cent fare limit for the bus is at Bloomfield Center, more than a mile beyond that of the railway. Similarly the buses run into Irvington for 5 cents, while the trolley fare limit is at the Newark city line. But on the other hand, the fact that several north and south car lines run through from city line to city line permits a much longer ride for 5 cents than is possible by bus because the latter lines all terminate in the center of the city.

The distance from Broad and Market Streets to the fare limit varies from about 2 miles on some lines to somewhat more than 3 miles on others. A kink that may cause some trouble is due to the bulge in the city line at South Orange Avenue. The distance a passenger may travel for a single fare on that route is thereby greatly increased over that which he can get on any parallel line.

NEW FARE FAVORS THE RAILWAY IN HUDSON COUNTY AND MEDIUM-SIZED CITIES

Second in importance is the Hudson division, serving Jersey City, Hoboken, Bayonne and neighboring municipalities. Here Bayonne was made one zone, Jersey City and Hoboken another zone, and the north Hudson towns a third zone. Throughout this division the prevailing trend of traffic is to and from the ferry terminals and the Hudson River tunnel stations. There is no suburban area outside the cities, and the greater part of the trolley patrons are riders within a single 5-cent area, except that many Bayonne people travel into Jersey City.

A curious feature of the situation in this district is that the bus lines in Jersey City have until recently charged a straight 10-cent fare. There has always been, therefore, a differential in favor of the railway, which became even more marked with the reduction of the base rate from 8 cents to 5 cents. This has now been met to some extent by a reduction in the bus rate to six tickets for 50 cents, and it is planned to inaugurate a weekly pass scheme with unlimited riding privileges for 90 cents.

Paterson and Passaic are typical mill towns. Geographically they cover comparatively small areas and they are therefore logical 5-cent communities. The buses did a tremendous business when their fare was 5 cents against 8 cents on the trolley. By the new plan, cars and buses are put on an almost equal footing, and it is to be expected that by the change the railway will profit in number of passengers carried. If this increase is great enough it will offset the smaller return per passenger.

Elizabeth, in the central division, is another typical 5-cent town. Local riding on the railway will probably be stimulated by the reduction in rates. However, on the Union line, an interurban route reaching that city, many people will have to pay higher fares because the old single-fare limit was beyond the city line. In the other towns of the central division the old 8-cent rate remains unchanged.

SITUATION IN SOUTHERN DIVISION IS UNIQUE

In Camden the layout of the trolley routes is the closest approach of anywhere on the Public Service system to the purely radial plan. Practically every line terminates at the Market Street ferry to Philadelphia. But one or another of the Pennsylvania, Reading and W. J. & S. railroads closely parallels each important railway route. So do the buses. Competition is therefore more intense, in that respect, in the Southern division than in any other.

The standard bus fare in this territory is 7 cents. Under the old conditions, therefore, the buses had the advantage of the trolley by 1 cent. Now the advantage is the other way within the city limits, the differential being 2 cents. But the people of Merchantville, Moorestown, Maple Shade, Haddonfield, Collingswood, Haddon Heights, Gloucester, Woodbury and other suburban towns find the new railway fare higher than the old.

This situation may result in loss of business for the company. Take, for example, the town of Haddonfield. Commuters to Philadelphia used to ride to the ferry for 7½ cents (using tokens). Now they must pay 10, and in addition thereto must pay 4 cents to cross the river. But the new 14-cent rate is higher than the monthly commutation rate on the railroad, which includes the ferry fare, and there are indications that former trolley patrons may desert this means of transportation.

METHODS OF FARE COLLECTION

A number of changes in the method of fare collection have had to be made in order to meet the demands of the situation presented by the new fare. Such lines as operate wholly within the limits of a 5-cent area operate on a simple pay-as-you-enter basis with a nickel rate instead of the former 8 cents. These cars carry a sign on the front dash reading in red on a white background "Five-Cent Fare."

A large number of routes run from the center of a 5-cent area to points outside the city limits and charge, therefore, a second 5-cent fare to reach the suburbs. On these lines the method of fare collection is pay-as-you-enter in the first zone, with free exit in that area and pay-as-you-leave in the second zone, with free entrance. Thus, local riders in either area may ride for a nickel, whereas through passengers pay 10 cents. In the vestibule window of each car on such routes has been placed a reversible sign reading "Enter at Rear, Pay as You Enter" or "Enter Here, Pay as You Leave." Dash signs indicate the fare.

In Essex, the largest of the railway divisions, one or the other of these two plans covers all important routes except Bloomfield. This is the longest line operating westward from Newark, as previously mentioned, and under the old arrangement it was a two-fare route. The fare limit was the boundary between Montclair and Verona, although a long overlap in the town of Montclair was permitted. Fare collection was by means of a second fare collector, who boarded the car at the overlap limit and collected from each person on the car either a cash fare or an identification check showing the passenger had boarded within the overlap. Under the new arrangement the Bloomfield line will have three fares. Outbound from the Public Service terminal to the Newark city line a 5-cent fare will be charged on the pay-as-you-enter plan. From the Newark city line to the Montclair-Verona line another 5-cent fare will be charged pay-as-you-leave. Passengers who come through from Newark intending to go into the third zone will pay their second fares to the collector who passes through the car as under the old arrangement. The third zone, between Montclair and Caldwell, will be an 8-cent pay-as-you-leave area. Inbound, the process is practically the reverse of this arrangement.

A number of slight changes may have to be made before the new arrangement will work smoothly. But inasmuch as only four days elapsed between the acceptance of the plan and its being put into effect, it was inevitable that this should have been the case.

Association News & Discussions

Claims, Emergency Stops, Weekly Pass, Bus Competition Interest Mid-West Association

Quarterly Meeting of the New Organization of Electric Railway Men of Six States Has a Large Attendance—Guests Are Entertained by Kansas City Railways

THE interest and enthusiasm displayed by the members in every paper presented at the second quarterly meeting of the Mid-West Electric Railway Association held at Kansas City, Mo., on Thursday, Sept. 20, was evidence that the association has succeeded in its purpose of bringing the officials of the electric railway industry in this territory closer together in an effort to solve one another's problems through an exchange of ideas and suggestions on subjects of importance to each company. More than 100 guests from six Middle-Western states were present.

The first paper at the morning session was presented by F. H. Harrington, general claims agent of the St. Joseph Railway, Light & Power Company, on "What the Operating Department Can Do for the Claim Department." He explained at some length the absolute necessity of harmony and close co-operation between these two departments. In too many instances the motormen and conductors fail to secure witnesses and statements from the parties in an accident when the trainmen feel that the responsibility for the accident rests entirely with the other party.

"The trouble is," said Mr. Harrington, "that the passenger or motorist states he is not hurt and pretends that the accident was a trifling matter, leaving the trainman under the impression that nothing would be done about it, and consequently negligence in securing the names of proper witnesses results.

"Then the passenger or motorist later 'develops' an injury, which was, of course, 'the direct result of the accident,' 'snitch' lawyers come to the rescue of the plaintiff, and in most cases the company must pay. The fact that the plaintiff told the trainman he was not hurt is of little value to the claim department and then, too, there is the absence of witnesses."

Retaining a trainman in the employ of the company merely to serve as a witness in an injury or damage case is not advocated by Mr. Harrington, especially when that trainman's record justifies immediate discharge.

In the discussion of this subject, R. B. Campbell of the Arkansas Valley Interurban, and R. A. Leussler of the Omaha & Council Bluffs Street Railway, stated that it was their policy to confide in the trainman and explain to him just what a certain accident had cost the company, especially if the record and character of the man was such as to justify his retention in the service. Both agreed, however, that this policy was not advisable where the trainman was to be discharged. Mr. Campbell added further that even in minor accidents where perhaps only a fender of a motor car was bent he called in the motorman to talk the matter over, pointing out that a very serious accident and loss of life might have resulted from such an accident. This method has proved highly satisfactory, resulting in a great decrease in accidents during the past year.

The advisability of mailing questionnaires to witnesses in minor accident cases was approved by the members in that it saved the expense of employing several additional investigators and at the same time reduced the statements of these witnesses to their own handwriting.

E. R. Fitch, district engineer of the Westinghouse Traction Brake Company, St. Louis, presented an interesting paper at the morning session on "Emergency Stops in Street Railway Operation." An abstract of this paper appears on another page.

The afternoon session was opened with a paper on "The Weekly Pass," presented by A. E. Reynolds, vice-president and general manager of the Springfield Traction Company, Springfield, Mo. This subject was of special interest to all members in that the weekly pass has been little tried in the Mid-West Association's territory.

Mr. Reynolds explained that the constant decrease in the Springfield company's receipts during the years 1921 and 1922 demanded some immediate action to increase revenues or it might have become necessary to suspend service entirely. Consequently it was decided to try the weekly pass in an effort to stimulate riding, and upon recommendations of a competent engineer this plan was placed in effect on April 1 of this year.

"I am not recommending the inauguration of the weekly pass as a panacea for your ills on other properties," said Mr. Reynolds, "but with us it has been a life saver. During the few months that the pass has been in use it has demonstrated that there is no loss whatever in transient travel, as the number of 7-cent cash fare riders has increased as many as 10,000 per month over the period when the pass was not in use. There is also a reduction of about 25 per cent in the use of transfers.

"It is a noticeable feature of our operation that since the adoption of the pass the earnings of the bus lines have materially increased. This can, no doubt, be explained by the fact that the pass is good on either street car or buses, whereas it was formerly necessary to pay 2 cents for a transfer from bus to street car. The pass holder uses the cars and buses on an average for about twenty-five rides per week.

"Summing up the whole situation, we are firmly of the opinion, after five months' use of the pass, that it is very satisfactory from all points of view and is one of the best advertising mediums the company could possibly adopt in an effort to obtain the good will of the public."

Mr. Reynolds pointed out that since April 1 the sale of tokens has been reduced about $4,425 per month, while the weekly passes sold in their place represent about $5,500 per month. He also added that unless given plenty of proper publicity for several weeks before its inauguration, the weekly pass would not be successful. In Springfield Mr. Reynolds published a full page advertisement in the daily papers every day for a month prior to the time the pass was put into effect, and a quarter of a page daily for about a month thereafter. At the present time only signs on the cars are used to advertise this feature. Mr. Reynolds gave out the operating statistics given in the table below to show the changes before and after the weekly pass was put on.

The last paper of the afternoon session was presented by William R.

	1923	1922	1921
Gross earnings—first three months	$85,750	$87,266	$88,945
Gross earnings—five months since weekly pass was put on	$151,822	$146,915	$150,281
Car mileage—first eight months	842,344	839,894	....
Total passengers for five months since weekly pass was put on	2,651,049	2,349,142	....
Average fare per passenger, cents	5.7	6.2	....

Taylor, vice-president and general manager of the Kansas City, Kaw Valley & Western Railway, on "Motor Bus Competition and Legislation."

"During the last ten years the commercial possibilities of the motor vehicle have been gradually promoted," said Mr. Taylor. "The hauling of freight came first. It grew from the privately-owned truck to the transfer company in the city, which gradually enlarged its field, until, stimulated by the demands made in the war period, extremely long trips were undertaken. These war demands were carefully fostered and enlarged by the brightest minds in the automobile game. Long trips, however, have proved to be a failure, and motor freight trucking does not pay for a distance of more than 25 miles."

Passenger buses have been successful on the east and west coasts, perhaps better in California, where climatic conditions are ideal. There the chief business is to entertain the crowd of tourists. These tourists are not regular riders and they are always leaving to make room for others.

Hauling of freight and passengers by motor-operated vehicles on hard-surfaced highways has indications of becoming a real public service business. For that reason it must be properly regulated, since it is now in the scheme of things to regulate all public utilities. Regulation is demanded by the farmers, the electric and steam railroads and every thinking taxpayer except the motor salesman. This feeling in favor of regulation is due to the direct effect on hard-surfaced roads and to unfair and unregulated competition. The cost of operating motor buses and the profits to the man in the business are very indefinite. This is due to the newness and to the type of men who have engaged in it so far. Most of them have kept no accurate records. So far as known no bus line paralleling an interurban has made money. It seems that for a bus carrying around twenty passengers it costs between 25 cents and 30 cents per mile to operate.

"Each railroad operator will have to study his own case carefully and, if he so desires, use the motor buses as a feeder, or in self-defense," said Mr. Taylor.

An informal dinner in the Elizabethan Room at the Baltimore Hotel, with talks by Colonel E. M. Stayton, R. W. Williams, and Robert P. Woods, closed the business session.

Colonel Stayton, city member of the Board of Control, Kansas City Railways, spoke briefly on the present pleasant relationship between the Kansas City Railways, the city and the public. Never before has there been a better understanding between the street railway and the public than exists at this time in Kansas City. This happy condition was brought about because the receivers placed all their cards on the table face up, asked the support of the public in building up the property, promised the best kind of service, and then actually delivered the goods.

"The rapid strides made by the receivers in obtaining the good will of the public and the resulting growth in receipts has been truly remarkable," said Colonel Stayton.

"Co-operation Between the Manufacturers and Operators" was the subject of a short talk by R. W. Williams, district manager of the Westinghouse Traction Brake Company.

"With the 5-cent fare in universal use and receipts rapidly falling off, something had to be done to help the operators reduce expenses," said Mr. Williams. "The safety car was brought out to meet this need and it has accomplished its purpose admirably. Indeed, the economies effected by the use of the one-man car operation have resulted in the expansion of this form of transportation until today we have in Kansas City one-man two-man cars equipped with multiple-unit control and complete safety car apparatus, operated in two-car trains."

Mr. Williams added that the problems of the operators were also the problems of the manufacturers and urged close co-operation between these "departments" of the electric railway industry to bring about the best results.

The meeting closed with an interesting talk by Robert P. Woods, vice-president and general manager of the Kansas City, Clay County & St. Joseph Railway, on "Sightseeing in Europe." Mr. Woods recently returned from a three months tour of France, Holland, Belgium, England, Scotland and Ireland. In addition to his pleasing description of conditions in Europe at this time, Mr. Woods provided a stereopticon exhibition of more than 100 scenes visited during his travels.

A number of supply men from this territory attended the meeting and, as Mr. Fennell, president of the association, stated, these "commercial ambassadors" played an important part in making the convention a success.

The place and date for holding the next quarterly meeting will be decided by the executive committee within the near future.

Emergency Stops in Street Railway Operation*

By E. R. Fitch

District Engineer Westinghouse Traction Brake Company

The shortest possible stop that can be effected with a moving car irrespective of possible equipment damage is the first requirement of an emergency application of the brakes, within the limitations, however, that the greatest possible equipment damage should be materially less than the average collision cost. One of the most important considerations in obtaining a clear understanding of emergency stopping is wheel sliding. When the wheels of a moving car stop turning during a brake application, the length of a stop is materially increased by the sliding. So the shortest stop that can be made occurs when the brakeshoe friction is just at the point of stopping the wheel rotation. If, however, the brake force is too high the shoe friction is greater than the rail adhesion and rotation is stopped even though the car is still moving. Because the sliding friction between the wheel and rail is less than that due to rolling, the stopping distance is increased by the use of too high a brake force. Therefore the fundamental limitation in securing high rates of retardation is the coefficient of friction between the wheel and the rail.

This factor varies widely for different rail conditions so it is necessary that the prevailing conditions govern the brake design. Another important fact to be considered in securing high rates of emergency retardation is that the ratio of the brakeshoe friction to the shoe pressure is not constant. This coefficient varies with the load on the shoe, the actual area of contact between the shoe and wheel, the length of time the brakes have been held applied, and has an astonishingly wide range at different car speeds.

The majority of cars in service are equipped with pneumatic brakes which include three interdependent factors, all of which are necessary to brake application; the pneumatic devices for the control of the air, the brake rigging to transmit the cylinder pressure to the brakeshoe head and the shoes themselves to develop the friction necessary to produce retardation.

For convenience in general comparisons, the nominal brakeshoe force is often expressed as percentage of the car weight, which is then termed the braking ratio of that particular car. If the nominal force developed at the brakeshoes were equal to the car weight, then the brake ratio would be 100 per cent, and if this total shoe pressure were developed with 50 lb. per square inch in the brake cylinder the statement might be extended to include 100 per cent brake ratio on 50 lb. per square inch cylinder pressure. This ratio is practically a standard for the majority of city and interurban cars for a full service brake application. An emergency application of the brakes produces a higher brake ratio.

Modern car equipment supplements the air brake with three safety combinations, that is, the hand brake, reversing the motors, and "bucking" or generating of the motors. Due to the limited space available the air and hand brakes are interdependent, and in a sense so are the reversing and bucking possibilities, though it is impossible to conceive of a collision and resultant damage that did not stop the car but rendered all four of these systems inoperative. Hand brakes are hardly to be considered a factor in emergency stopping, for they actually require several seconds for a serviceable application, and time is the all-important factor until the brakes are set. Reversing the motors with power on the car quickly applies a retarding effect which, however, is not comparable with the air brake emergency retardation in amount and is a uselessly severe strain on the motor and control equipment. Similarly, bucking the motors even though the circuit breaker is out or the trolley off produces a quick retardation but retains the same disadvantages as does reversing. Retardation can be accomplished in this manner on any car equipped with direct-current series motors with the series parallel type of control, or where any two of the car motors can be connected in parallel.

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*Abstract of a paper presented at meeting of the Mid-West Electric Railway Association held in Kansas City, Mo., Sept. 20, 1923.

The relative effectiveness of these four methods of retardation would be in the following sequence: Emergency application of the air brake, reversing the motors, bucking the motors and hand brake, though the relative average resulting damage to equipment would undoubtedly be hand brake, emergency application of the air brake, reversing and bucking. Under no consideration should any two of these methods be used together. This restriction is unusually important and is unfortunately often disregarded through ignorance or lack of proper instructions.

The reason for this fixed restriction is found in the fact that the emergency application of the brakes is designed to produce a retarding effect just short of wheel sliding, and any additional drag on rotation is sure to lock the wheels. The average retardation for the rest of the stop would be about one-third as effective as if the wheels were turning, and even the use of sand under these conditions will not help the situation materially, for the resulting increase in the rail friction is not sufficient to counteract the increased drag on wheel rotation.

It is obvious that the entire question of emergency stopping depends upon the adhesion of the wheel to the rail, and under adverse rail conditions the coefficient of adhesion attains but a fraction of its normal or dry rail value. This factor varies from about one-tenth for the poor rail condition to about thirty-five-one-hundredths for the good rail with all the intermediate values at times. The statement is often made by our steam road confrères that "a wet rail is not necessarily a bad rail but is often times the reverse." In traction service, unless the cars are operated on private right-of-way with the rail heads at a nominal elevation above the ground surface, a wet rail is invariably bad. Enough mud, slime, and slush is deposited on the rail by traffic or splashing to keep it constantly lubricated with a slippery sediment, and a rain that cleans a surface elevated slightly over the ground is equally as bad on flush surface rails as a fine greasy mist. For street railway operation the brakes are designed to develop their maximum rate of retardation on dry clean rail, and are made extremely flexible or sensitive to control for the adverse track conditions.

There is no doubt that slippery rails preclude the use of the emergency application except on straight air-brake cars where a quick application does duty for emergency, for this brake is capable of an immediate release. Equipment with an emergency valve or triple valve, however, cannot be immediately released, and with these the use of emergency position of the brake valve should not be encouraged when operating on bad rail. There is altogether too much tendency in the operating department to feel that everything possible was done to prevent a collision if an emergency application was made, even though wheel sliding took effect immediately.

A thorough explanation of the proper use of sand should be given new men. Before sliding occurs sand increases the coefficient of adhesion about five-one-hundredths, but after wheel sliding has started the coefficient of kinetic friction between the wheel and rail amounts to about one-third that of adhesion and the slight increase resulting from the application of sand produces little effect on the length of stop but does increase the tendency toward flat wheels.

The problem of securing satisfactory emergency stops when operating on heavy grades introduces another factor into an already complicated situation. To have full control of a car on a down grade it is necessary to develop an average retarding force equivalent to the grade force of acceleration. For convenience this retarding force might be expressed as a required brake cylinder pressure to overcome the grade effect, and the difference between this pressure and the total actually obtainable on the car would be available for making a stop. If a 30,000-lb. double-truck car braked at 100 per cent on 50 lb. per square inch pressure with a passenger load of thirty-three people, or about 5,000 lb., started down a 5 per cent grade at 15 m.p.h., then a brake cylinder pressure of 18 lb. per square inch would be necessary to just control the car and the remaining pressure would be available for stopping. On a level this car would make an emergency stop in about 28 ft., whereas on the 5 per cent grade the stop would be accomplished in about 37 ft. The stop distance, therefore, due to the grade alone, has been increased 9 ft. or, for these conditions only, about 30 per cent.

Grade requirements for brake design in traction service include special provision for decreasing the length of stops by using higher brake ratio and also throw an added burden on the car operator. The only satisfactory answer to the question of emergency stopping on severe grades is that of added caution, lower speeds, and road tests of equipment.

Delegates Consider Safety Measures

Electric Railway Section of National Safety Council, at Largest Meeting Ever Held, Discusses the Best Methods of Preventing Accidents

GREATER co-operation between the American Electric Railway Association and the Electric Railway section of the National Safety Council on the preparation of bulletins and other phases of safety work affecting the welfare of the electric traction systems of the country was urged by J. H. Truett of the safety committee of the United Railways & Electric Company of Baltimore, chairman of the electric railway section of the National Safety Council, at the opening session of the section in the Hotel Statler in Buffalo on the morning of Oct. 2.

The meeting was the largest and most interesting ever held by this section. About seventy-five representatives of electric railway lines throughout the country were present. The room given over to this section by the National Safety Council was too small to accommodate all who wished to hear the addresses and participate in the discussions which followed, so that larger quarters were prepared for the second session of the conference held on Thursday.

Chairman Truett opened the meeting of the section with a brief address in which he told of the increased support being given by electric railway systems to the problems of public safety, and he urged even greater support in the future. M. W. Bridges, secretary of the section and safety engineer of the Metropolitan West Side Elevated Railway of Chicago, presented a brief report of his activities during the year and pleaded with members to submit more safety suggestions to the council.

According to Mr. Bridges, the membership of the section had increased during the past year from 110 to 126. In February the executive committee created a committee on public education with Victor Noonan of the Cleveland Railway as chairman to assist in educating the traveling public through the use of newspaper advertising, car cards on dashboards, posters, etc., in accident prevention among railroad patrons. The membership committee was authorized to approach the 283 members of the American Electric Railway Association, which were not members of the council, with the view of securing their membership.

The membership committee reported that through an active campaign the membership had been increased.

The bulletin committee asked for suggestions for bulletins and said that the safety educational methods incorporated in bulletins issued by the committee have done much to reduce accidents. The only complaint found by members was that there have not been enough bulletins. At this point in the discussion members urged greater co-operation between the bulletin committee and the advertising section of the American Electric Railway Association regarding the size of bulletins. Standardized sized bulletins were urged and members were asked to submit to the committee the sizes of the bulletins they use so that the committee can present facts on plans for standardized bulletins at the next meeting.

It developed during the discussion that one company is required to pay the company which has the exclusive advertising contract in its cars $3,600 a year to put bulletins on safety inside its cars. It was suggested that swinging signs from the roof of the car be used, as this does not infringe upon the rights of the advertising companies.

George B. Anderson, manager of service of the Los Angeles Railway, Los Angeles, Cal., was unable to attend the conference and his paper, "The Award System as a Means of Preventing Accidents," was read by John C. Collins, supervisor of safety for the Los Angeles Railway. This paper is published in abstract in this issue.

G. T. Hellmuth, claims attorney for the Chicago, North Shore & Milwaukee Railway, opened the discussion by saying that the Los Angeles plan promotes safety and courtesy, and he urged that the subject be continued another year so that additional suggestions could be secured from other railways.

H. M. Keyser, secretary and claims attorney of the Washington Railway & Electric Company, Washington, D. C., gave a few figures applying to the Washington company since the inauguration of a safety campaign. Accidents arising from collisions of cars have been reduced 66.7 per cent, Mr. Keyser explained; no-report cases were cut 47.8 per cent; serious injury cases, 42 per cent; not serious injury cases, 24.6 per cent, and deaths arising from accidents were reduced 43.7 per cent.

R. R. Hadsell of the New York State Railways, Rochester Lines, was appointed chairman of a special committee to continue the investigation of the award system as a means of preventing accidents. The committee was authorized by Chairman Truett to gather data from railways throughout the country using the merit system and compile it for distribution among members of the electric railway section of the council. Mr. Hadsell was authorized to appoint his own committee to assist him in the undertaking.

Chairman Truett appointed this nominating committee to report at the Thursday morning meeting: A. W. Koehler of Rochester, D. D. Haskins of Chattanooga and D. E. Parsons, general manager East St. Louis & Suburban Railway, East St. Louis, Ill.

An account of the Wednesday and Thursday sessions will appear in a later issue.

The Award System as a Means of Preventing Accidents[*]

The Merit and Demerit System Was First Ridiculed but Is Now Recognized as Desirable and Has Reduced Damage Claims—Company Morale Improved, and Pride in a Clear Record Is Clearly Evidenced

By George Baker Anderson
Manager of Transportation Los Angeles Railway

AN INSPECTION of the methods generally employed among street railway operators up to a comparatively recent period indicates the lack of an adequate system of checking and recording the services of trainmen worthy of commendation, and those calling for disciplinary action. There are today in the United States many thousands of trainmen who have persistently violated certain necessary rules and have been suspended from service for from one to ten days in their records—but in their records only—such suspensions not resulting in the loss of a moment's time or a dollar in their pay envelopes. As the result of such so-called discipline, the individual involved was warranted in feeling a certain sense of security, regardless of the storm signals raised. Under the merit system as applied in Los Angeles, all this has been changed.

The plan, at first opposed, even ridiculed by some of the 2,500 men in the platform service, now apparently meets with the approval of practically all, the exceptions being some extra men not yet under the system and a few indifferent ones.

No man is entitled to participate in the bonus of $60 per year until he has been in the service six months. The amount of the bonus paid depends entirely upon the trainman's record under the merit system. During this probationary period, no man receives credits or demerits. On the day following the expiration of the probationary period the name of the trainman is entered upon the "efficiency record" card with a standing of 100 per cent. The bonus year begins Dec. 1 and ends Nov. 30. The bonus is paid by special check at a general assembly of the men on Dec. 15, a date decided upon because of the holiday needs of the men. To be entitled to the bonus or any portion thereof, a trainman's name must be on the payroll the last day of the bonus year, Nov. 30. On that date all records are cancelled, and every man starts the new bonus year, beginning Dec. 1, with a rating of 100 per cent.

SAFETY AND COURTESY EMPHASIZED IN MERIT SYSTEM

Demerits are assessed for infractions of certain important operating rules.[†] The rules pertaining to safety and courtesy come first. Violations of these rules bring the heaviest penalties, and careful observance of them brings substantial reward.

The operating heads of the Los Angeles Railway believe that under normal conditions a trainman who is courteous and considerate in his dealings with passengers is attentive to considerations of safety also. The transportation department has set forth very plainly that valid excuses may be offered for almost any failure except insolence or discourtesy, and most collisions between cars. Running ahead of time also is dealt with severely, as it is regarded as one of the most unnecessary and demoralizing practices and as exhibiting an inclination toward careless operation. A comparison of notes for three years or more indicates that the man who persistently runs ahead of time is a man who is inclined to take chances. His desire to "beat it" leads him into dangerous situations. All other forms of dangerous operation likewise are penalized.

For some offenses like the vicious practice of running ahead of time, demerits are cumulative. Cumulative demerits sometimes result in automatic dismissal, a man's connection with the company terminating when his rating on the merit card falls as low as 75 per cent.

The bulletin announcing the establishment of the merit and bonus system was issued on April 9, 1920. It read as follows:

> To foster efficiency, the existing method of discipline for trainmen will be discontinued and a Merit System, or plan of "Discipline by Record," instituted, effective April 10, 1920. Every trainman will start with a clear record.
>
> Credits will be given for meritorious service, such as alertness in preventing accidents, the exercise of good judgment in emergencies, making accurate reports and other acts worthy of special commendation. Demerits will be given when discipline is necessary. Each five credits will count 1 per cent on record and each five demerits will count 1 per cent off record. Demerits will be charged only when, after investigation, a trainman is found to be at fault.
>
> Ratings will be made upon reports from division superintendents, supervisors, patrons and other sources. A rating of 100 per cent will represent the maximum of capacity, efficiency, service and conduct. A rating of 75 per cent will represent the minimum of capacity reasonably allowable. A rating below 75 per cent should represent a standard of service, capacity and conduct below any reasonable requirement and will be sufficient cause for dismissal from the service.
>
> If upon investigation extenuating circumstances are found to exist and reinstatement is approved, the trainman so reinstated may resume his duties with a standing to be determined by the head of the department.
>
> An accumulation of markings above 100 per cent will be sufficient cause for special consideration of trainmen.
>
> The rating will be entered upon individ-

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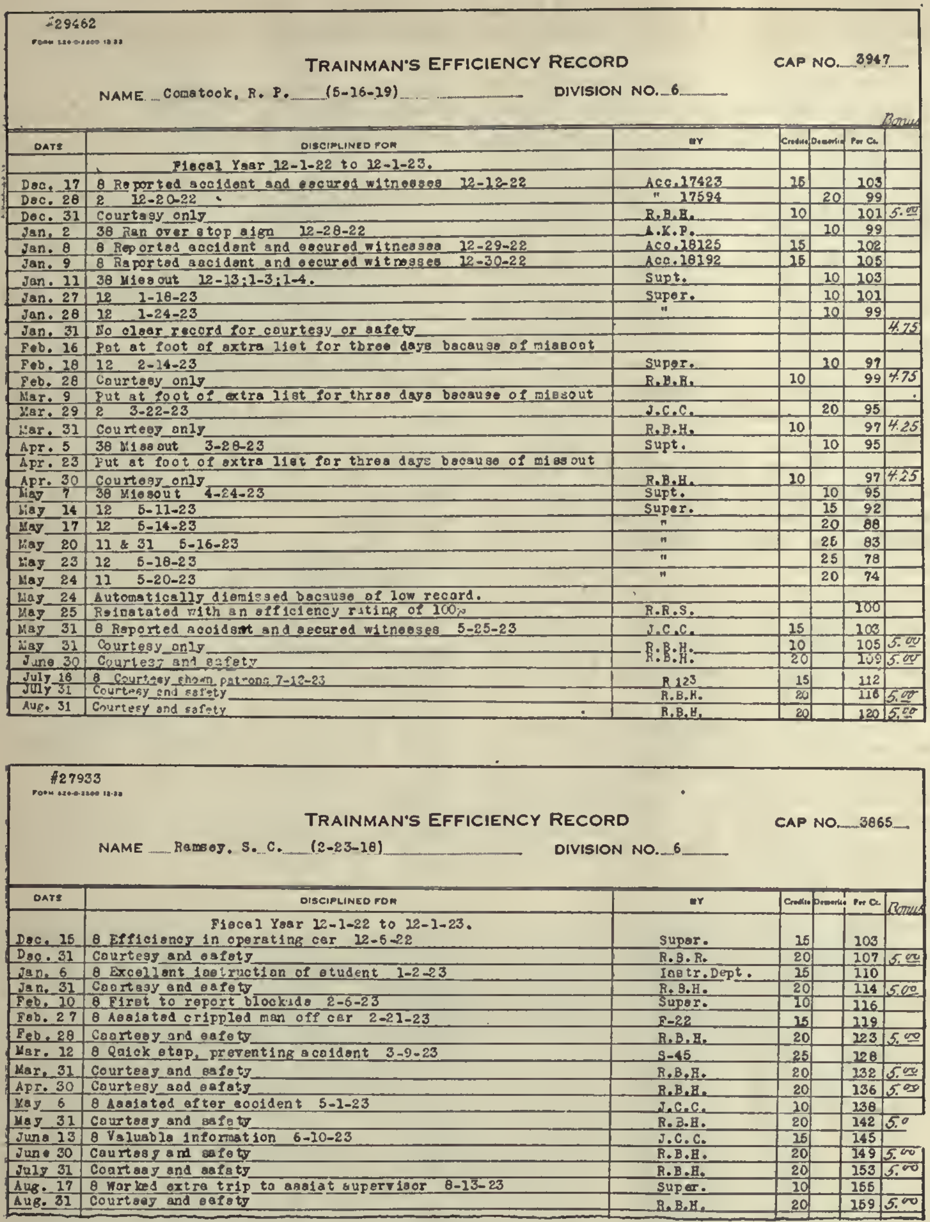
[*] Abstract of paper presented at annual meeting of National Safety Council, Buffalo, N. Y., Oct. 1-5, 1923.

[†] A list of the ratings for merits and demerits for the Los Angeles Railway Corporation was published on page 721 of the issue of this paper for April 28, 1923. With the exception of a few slight changes in ratings this list still applies. Other particulars of the merit system will be found on page 131 of the issue for July 22, 1922. —EDS.



#29462

TRAINMAN'S EFFICIENCY RECORD CAP NO. 3947

NAME Comstock, R. P. (5-16-19) DIVISION NO. 6

DATE	DISCIPLINED FOR	BY	Credits	Demerits	Per Ct.	Bonus
	Fiscal Year 12-1-22 to 12-1-23.					
Dec. 17	8 Reported accident and secured witnesses 12-12-22	Acc.17423	15		103	
Dec. 28	2 12-20-22	" 17594		20	99	
Dec. 31	Courtesy only	R.B.H.	10		101	5.00
Jan. 2	38 Ran over stop sign 12-28-22	A.K.P.		10	99	
Jan. 8	8 Reported accident and secured witnesses 12-29-22	Acc.18125	15		102	
Jan. 9	8 Reported accident and secured witnesses 12-30-22	Acc.18192	15		105	
Jan. 11	38 Miss out 12-13;1-3;1-4.	Supt.		10	103	
Jan. 27	12 1-18-23	Super.		10	101	
Jan. 28	12 1-24-23	"		10	99	
Jan. 31	No clear record for courtesy or safety					4.75
Feb. 16	Put at foot of extra list for three days because of missout					
Feb. 18	12 2-14-23	Super.		10	97	
Feb. 28	Courtesy only	R.B.H.	10		99	4.75
Mar. 9	Put at foot of extra list for three days because of missout					
Mar. 29	2 3-22-23	J.C.C.		20	95	
Mar. 31	Courtesy only	R.B.H.	10		97	4.25
Apr. 5	38 Miss out 3-28-23	Supt.		10	95	
Apr. 23	Put at foot of extra list for three days because of miss out					
Apr. 30	Courtesy only	R.B.H.	10		97	4.25
May 7	38 Missout 4-24-23	Supt.		10	95	
May 14	12 5-11-23	Super.		15	92	
May 17	12 5-14-23	"		20	88	
May 20	11 & 31 5-16-23	"		25	83	
May 23	12 5-18-23	"		25	78	
May 24	11 5-20-23	"		20	74	
May 24	Automatically dismissed because of low record.					
May 25	Reinstated with an efficiency rating of 100%	R.R.S.			100	
May 31	8 Reported accident and secured witnesses 5-25-23	J.C.C.	15		103	
May 31	Courtesy only	R.B.H.	10		105	5.00
June 30	Courtesy and safety	R.B.H.	20		109	5.00
July 16	8 Courtesy shown patrons 7-12-23	R 123	15		112	
July 31	Courtesy and safety	R.B.H.	20		116	5.00
Aug. 31	Courtesy and safety	R.B.H.	20		120	5.00

#27933

TRAINMAN'S EFFICIENCY RECORD CAP NO. 3865

NAME Ramsey, S. C. (2-23-18) DIVISION NO. 6

DATE	DISCIPLINED FOR	BY	Credits	Demerits	Per Ct.	Bonus
	Fiscal Year 12-1-22 to 12-1-23.					
Dec. 15	8 Efficiency in operating car 12-6-22	Super.	15		103	
Dec. 31	Courtesy and safety	R.B.R.	20		107	5.00
Jan. 6	8 Excellent instruction of student 1-2-23	Instr.Dept.	15		110	
Jan. 31	Courtesy and safety	R.B.H.	20		114	5.00
Feb. 10	8 First to report blockade 2-6-23	Super.	10		116	
Feb. 27	8 Assisted crippled man off car 2-21-23	F-22	15		119	
Feb. 28	Courtesy and safety	R.B.H.	20		123	5.00
Mar. 12	8 Quick stop, preventing accident 3-9-23	S-45	25		128	
Mar. 31	Courtesy and safety	R.B.H.	20		132	5.00
Apr. 30	Courtesy and safety	R.B.H.	20		136	5.00
May 6	8 Assisted after accident 5-1-23	J.C.C.	10		138	
May 31	Courtesy and safety	R.B.H.	20		142	5.0
June 13	8 Valuable information 6-10-23	J.C.C.	15		145	
June 30	Courtesy and safety	R.B.H.	20		149	5.00
July 31	Courtesy and safety	R.B.H.	20		153	5.00
Aug. 17	8 Worked extra trip to assist supervisor 8-13-23	Super.	10		155	
Aug. 31	Courtesy and safety	R.B.H.	20		159	5.00

Efficiency Cards—Above, That of a Motorman Who Discharged Himself but Built Up His Record Again. Below, a Good, Clean Record

ual cards and each record may be examined at any time by the man affected.

As an incentive to trainmen to maintain the highest possible efficiency, the company has set aside a fund based upon an award of $60 per year, or $5 per month, covering the period from April 10, 1920, to Nov. 30, 1920, inclusive, for each man in the service coming under the operation of this rule, which will be paid on Dec. 15, 1920, to each man in the service on Nov. 30, 1920, who has a clear record and has been continuously in the service of the company for the entire period; and the proper proportion of this amount to those who have a clear record and have been in the service of this company for more than six months and under eight months; or the proportion of such sum as has been earned.

All records will be balanced monthly and the percentage of efficiency determined thereby. This efficiency rating for each month will determine the proportion of the maximum amount to be credited to each trainman for that month.

Such portion of the total amount set aside for distribution as may not be absorbed through the operation of the foregoing plan, by reason of the failure of any trainmen to attain ratings entitling them to the extra money, will be applied to a fund for the relief of all employees.

A deduction of 25 cents is made for each 1 per cent below the 100 per cent standard for any month. (Example: A rating of 95 per cent leaves but $3.75 due the trainman for that month.)

Anything affecting the pocketbook of the average wage earner is of immediate interest, but as has been shown, the amount of cash a trainman receives at Christmas time is not the greatest spur in all cases. There have been many cases in which men have gone to great lengths to disprove charges on which demerits were based, although the rating of these men was so high that there was no probability of their failing to receive the full bonus for the year. Keeping their records clear of demerits was with them a matter of personal pride. In many other cases trainmen have exerted strenuous efforts to eliminate or counterbalance demerits, but not until the percentage of efficiency fell below 100 per cent and meant actual monetary loss to them.

R. R. Smith, assistant superintendent of operation, who is in charge of the administration of the Los Angeles Railway's merit system, states that a comparison between the handling of discipline under this plan and the haphazard methods which prevailed before its adoption proves conclusively that the merit system is the logical way to administer discipline. But as we profit by experience, he finds it necessary from time to time to make certain changes.

ADMINISTRATION OF METHOD IMPORTANT

The close relationship between the morale of the men and the administration of discipline by record makes the methods of such administration of paramount importance, and we find that several factors should be given consideration in changes to be made for the coming fiscal year. In the first place, in order to maintain the morale of the men, reports on which demerits are assessed must be of such a nature as to allow no doubt as to their reliability. Most of the recommendations on which demerits are based come from secret service operatives and supervisors (or inspectors). More attention is to be paid to details in making such reports, and with few exceptions the conditions under which our men are operating are such as to make it necessary at times for a man to use judgment in enforcing a rule. The supervisor or operative who recommends demerits merely because he notes the violation of a rule, without making allowance for obvious extenuating circumstances, is doing much toward breaking down the morale of the men.

The ideal plan, toward which we are working, is to place the records in charge of one competent person who can devote all his time to the administration of the system, follow up recommendations for discipline as they are received, increase penalties in cases where men are shown to be repeaters, and fix a definite length of time for demerits to stand, after which, if it be proved by the record that the man has profited by the assessment of such demerits and has not repeated the offense, the demerits will be automatically canceled.

If there has been one mistake a little more surely demonstrated than the others during the first three years of the operation of this system it is that of having been too generous in the award of credits. It has been found in some instances that men with high efficiency ratings, but with some demerits, are disposed to treat demerits slightingly after attaining what appears to be a position of security, so far as the bonus is concerned. Such men are disposed to make no appeal on account of demerits assessed until after their efficiency rating has dropped below 100 per cent, when they immediately appeal, in some instances even admitting that they do so because their rating has dropped to the point where it prevents them from earning the full bonus. These short-sighted men, of course, lack the proper spirit of service, but they are not numerous.

Generally speaking, during the past three and a half years the number of accidents and the volume of claims and damages on the books of the Los Angeles Railway have shown us material increase year by year, although during that period the population of the city has increased approximately 50 per cent, the number of cars in service has increased 26 per cent, the daily mileage has increased about 10 per cent, the number of passengers carried upon the street cars has increased more than 40 per cent. Just how much of the credit for this rather remarkable showing should be awarded to the merit system is hard to determine, but that the plan has operated effectively to reduce accidents of all classes is admitted by all observers, including those authorities who at the beginning were the most skeptical.

The degree of success to be attained through the application of the idea is influenced largely by the character and personality, particularly the temperament, of the individual intrusted with the responsibility therefor. It is highly essential that such authority be a man of firmness, poise and self-control, possessed of capacity for judging men, and actuated by a spirit of justice.

Accompanying this paper there is submitted a specimen efficiency card showing the history of the service of a motorman which resulted in his automatic dismissal from the service, reinstatement after this severe discipline, and immediate improvement in personal service, also a specimen efficiency card showing a motorman's record built up by the merit system.

Safety Principles as Applied to the Individual Utility*

By D. E. Parsons
General Manager East St. Louis & Suburban Railway, East St. Louis, Ill.

OUR safety department is an integral part of our organization. It is headed by a man of ability with the title of safety engineer. Our safety committees are composed as follows: Central committee, consisting of the general manager, general superintendent, and a reasonable number of department heads. This central committee meets regularly once a month and acts upon all suggestions that are offered by the sub-committees. The sub-committees are as follows: Mechanical committee, power committee, gas committee, electrical committee, maintenance of way committee and transportation committee. The personnel of these committees is about forty members. The sub-committees are selected by workmen in the different departments. The committees not only accept and pass on suggestions for the benefit of safety of their fellow workmen, but also make suggestions which are beneficial to our customers—the traveling public. This committee work is interesting and is eagerly sought after by our employees.

We are very favorable to the illuminated bulletin boards placed in conspicuous places. These bulletin boards carry bulletins of the National Safety Council and others of interesting world events.

Our safety engineer, in addition to attending meetings of all committees, makes a monthly inspection of every nook and corner of the property for accident and fire hazards, and makes, in addition to the committee reports, his own report of his inspection. Before we made our systematic inspections our annual fire insurance was $953,000 with an annual premium of $4,923, or a basic rate of 51.7 cents per $100. Today the total amount of our insurance carried is $1,862,000 and the annual premium is $5,493, with a basic rate of 29.5 cents per $100. This showing has been accomplished by careful inspection and good housekeeping, and no expenditure of new money was approved that would not pay for itself in premiums in two years.

In all of our safety and fire prevention work, as well as our compaigns on unusually clean cars and courteous employees, we did not forget to inform our traveling public in well-worded advertisements what we were accomplishing for their benefit. Our advertising is not spasmodic but is continual in all cars and in all newspapers in all the cities in which we operate.

With our continual safety program we endeavor to interpose occasionally some special stunt which adds to the interest of our work. For instance, in 1921, we painted one of our regular city cars several coats of white enamel with bulletins on the sides and ends of the car. The following were some of the slogans used: "Do your duty, obey the laws and ask others to do likewise." "Reckless drivers make your city unsafe for safe drivers."

Recently we installed on two interurban cars Klaxon, air-operated horns. Such a horn warns the driver of the noisiest Ford or truck of the approach of the car and meets the approval of all the communities in which we operate. We believe that this Klaxon air-operated horn is much more satisfactory than the standard air whistle on the average interurban car.

We have decided to change the wording of the picture on our 300-ft. highway crossing signs every two years so as to make them so attractive that they will not be overlooked by any automobile driver.

We have been able partially to convince the Illinois Commerce Commission that about 50 per cent of our crossings are extra-hazardous instead of about 10 per cent and the commission has ordered "stop" signs installed. According to Illinois law automobile drivers must stop before a crossing where these signs are placed.

At the suggestion of our local automobile clubs we recently adopted a special lens on interurban headlights that somewhat obviates the glare and, at the same time, gives the same illumination as the original clear glass lens. This has met the approval of the automobile drivers.

We recently adopted a rule on our interurban lines where hard roads cross the right-of-way that motormen must approach and pass over such crossings at such speed that collisions would be improbable. This is in addition to our regular rule that motormen must sound whistle or ring bell vigorously on approaching such road crossings. We believe that this rule has materially reduced highway crossing accidents.

There has been a continual decrease in the number of accidents to employees from year to year, in spite of an increase in the number of employees. There has also been a decrease in the expense for injuries and damages. On the East St. Louis Railway, 2.29 per cent of the gross passenger revenue is our record for the year 1922; for the East St. Louis & Suburban Railway suburban and interurban lines it is 4.85 per cent. Automobile collisions with interurban cars in 1921 were 171; in 1922, 149. On the East St. Louis Railway, which is strictly a city line, in 1921, the automobile collisions were 218 and in 1922, 270. A careful analysis of the automobile and car collision records shows there has been a decrease each year in the number of collisions where our cars were moving at the time of the collision, but there has been an increase in the number of collisions where automobiles collided with our cars that were standing still.

The trouble with the average manager of a public utility who is not thoroughly in accord with spending even 1 per cent of his gross income for safety work is that he allows the operating department to start a safety program and if it does not show a decrease in money expended for injuries and damages the first or second year he becomes skeptical and is not in thorough accord with the movement. It will take more than two years on most properties that have not had thoroughly organized safety work to make a very material saving in dollars and cents. The management of nearly every public utility property has a hobby of some kind which is pleasing to its patrons or customers, and I do not know of any hobby that an up-to-date manager could adopt with less expense for the benefit of the public than well organized safety. It has proved that it is conducive to good business.

Manufacturers Will Show How They Are Co-operating

ALL exhibitors at the Atlantic City convention next week have been invited to make a little exhibit in their booths showing in what manner they have been co-operating with the electric railways in informing the public, and particularly their employees, on the true situation with the railways. This is in conjunction with the work of the committee on co-operation of manufacturers, headed by E. F. Wickwire, secretary Ohio Brass Company. On Wednesday, a committee, comprising F. R. Coates, L. S. Storrs, H. B. Flowers, D. W. Pontius, James P. Barnes and C. D. Emmons, will inspect these exhibits and present a certificate of appreciation to those companies which have joined in the work.

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*Abstract of paper presented at annual convention of National Safety Council, Buffalo, N. Y., Oct. 4, 1923.

Maintenance of Equipment

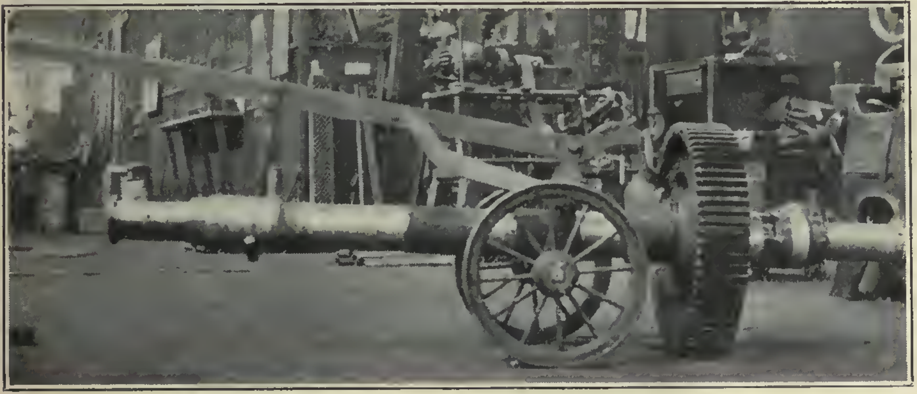
Carriage Makes Axle Handling a One-Man Job

THE machining of axles in the West shops of the Chicago Surface Lines is done in lathes at a considerable distance from the presses where wheels are mounted. The handling and transporting of axles are done in a very convenient manner by a two-wheeled carriage shown in the accompanying illustration. This carriage was made in the company's shop and consists of two cast-steel wheels 18 in. in diameter with 2-in. tread and a cross-connection raised 9 in. above the center of the wheels. This cross-connection is made of 1¾-in. x 1¾-in. iron and has the axles for the wheels fastened at either side.

The carriage can be run over the axle as it lies on the floor with the gear mounted in position. With the carriage over the axle the light end is lifted into a hook support and then by raising the handle another hook at the front end of the carriage can be easily placed next to the gear. Then by lowering the handle of the carriage, the entire axle and gear are lifted free of the floor and can be transported easily.

The handle of the carriage is 6 ft. from the fulcrum to the end, and the extension toward the front of the carriage is 8 in. long. A cross handle 2 ft. long is fastened to the end for convenience in pulling and pushing the carriage. The long handle is made of 2-in. x ⅝-in. iron. The hook for the light end of the axle is 1 in. in diameter, and four holes are provided for adjustment to accommodate different lengths of axles. The hook for the front end of the carriage is made of ⅝-in. x 5-in. plates.

In order to provide a permanent construction and relieve the strain on the handle, two side braces made of ½-in. x 1¾-in. iron are used. These are fastened to the handle and run to the cross-member between the two wheels.



Moving an Axle and Gear to a Lathe for Turning

Use of Steel Castings Reduces Breakage

BY O. A. NORENE

Assistant Master Mechanic Omaha & Council Bluffs Street Railway

THE life of gears and pinions depends to a great extent on the gear cases being kept in good condition. We have experienced a lot of trouble from broken gear case supports, both on the malleable and wrought iron types. For the last two years we have replaced these with cast steel, from which we have had a very small proportion of breakage. A large part of all our gray iron castings are being replaced by steel castings.

All the various truck and body bolster center bearings are being replaced by one standard cast steel bearing, whereby only one type is now carried in stock in place of six or eight. Nearly all of our malleable iron fender intermediates have been replaced with cast steel, thus greatly reducing the breakage. When they are returned to the shop for repairs they are mostly bent out of shape, but very seldom are broken.

Old Mower Rebuilt for Railway Use

ONE of the cheapest weed cutting machines ever devised was recently built by the Gary & Southern Traction Company, Crown Point, Ind. An old mower was bought from a neighboring farmer for the sum of $4. Worn and broken parts were repaired at the carhouse by acetylene welding, and the device was then mounted on a pair of hand-car wheels. The pole of the mower is attached to the rear of one of the railway's cars. The operator of the machine sits in the seat just where the farmer did when the mower was pulled by horses. Good speed of operation is possible, a 10-mile stretch of track having been completely cut recently in eighteen hours.

An Ordinary Mower Mounted on Flanged Wheels and Pulled by a Railway Car

New Equipment Available

Slanting Bed Switch

The new Wharton slanting bed switch is a somewhat radical departure from designs of tongue switches now on the market. Two principal features distinguish it: first, a tongue of "I" beam section, gradually increasing in depth from the point to the heel with a corresponding downward slope of the bed on which the tongue rests; second, a novel method to take up wear of the circular heel.

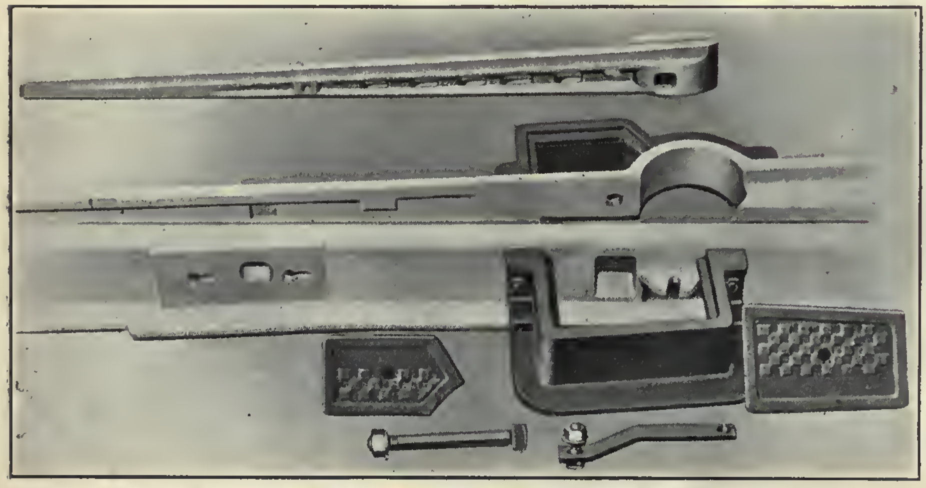
The tongue is made the usual depth at the point, and slopes to a much greater depth at the heel, instead of being of a uniformly shallow depth throughout. The "I" beam section gives it much greater strength, stability and resistance against tilting, or distortion under traffic.

The bottom of the tongue presents an uninterrupted surface in one plane having a continuous bearing on the machine ground bed for its entire length from the point to the extreme heel. There are no depressions or projections of any kind. The increasing thickness gives sufficient depth through the body of the tongue for springs or other actuating devices, without the necessity of a downwardly projecting lug.

Many tongue pivot tightening devices consist of blocks, bearing only on a small part of the lower portion of the circumference of the pivot, and in taking up wear, will not restore contact around the cylindrical bearing surfaces. The heel tightening device of this switch is based on the principle of a split collar. Part of the wall of the socket into which the heel fits, and which is an integral part of the switch casting, is made flexible by a longitudinal slot at its junction with the bottom of the bearing. By means of a large size bolt the wall is drawn in until it hugs the tongue heel. Thus the wear is taken up through contraction of the radial dimension of the socket. The nut of the bolt is located in one of the drain boxes, readily accessible.

A "hold-down" at the center of the pivot, accessible from the other drain box, prevents dirt from working underneath and raising the tongue, although with the sloping bed there is a natural tendency to keep the tongue down and the joint on the tread surface tight.

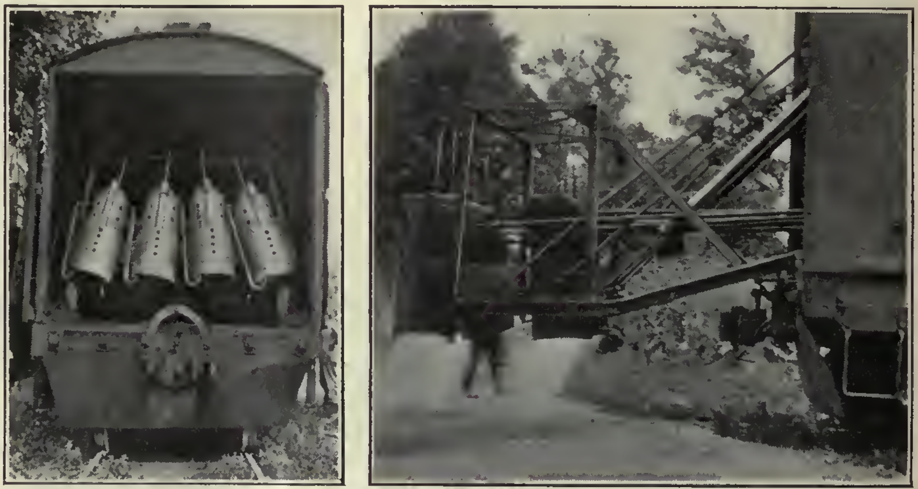
The downward slope of the bed gives a natural drainage toward the drain boxes, located on both sides of the heel, preventing water from settling at the point of the tongue, except on extremely steep up-grades. This also eliminates splashing on mechanically operated switches. The longitudinal openings through the wall at the heel give opportunity for drainage and for dirt to escape into the boxes, which can easily be cleaned out.



This New Switch Has a Specially Shaped Tongue and a Novel Way to Take Up Wear on the Heel

Weed Burner Has Successful Trial

Experiments which were recently made on the property of the Aurora, Plainfield & Joliet Railway with the Lamb weed burner were entirely successful. At a cost of $15 per mile the burner produced as good results, according to the company, as had previously been obtained with a chemical exterminator at a cost of $54 to $65 per mile.



Rear End of Car with Weed Burner Housed. At Right, the Carriage Is Extended and the Seven Burners Are in Operation

The present device is an outgrowth of attempts by the inventor to perfect a burner which would exterminate the weeds without danger of setting fire to vegetation near the tracks. As will be seen from the accompanying photograph, it consists of seven blow torches of large size mounted in a carriage which is projected from the rear end of the box car. Gasoline is used as fuel, and each torch measures 17 in. in diameter by 42 in. long. Played on the roadbed from a height of approximately 3 ft. 6 in., the intense heat at the track level is sufficient not only to exterminate the growth above the ground, but will also dry out and kill the growth to a depth of 2 in. below the surface. Traveling at the rate of approximately 6 m.p.h. and covering a roadbed width of approximately 10 ft., the burner consumes 48 gal. of gasoline per hour, or in the neighborhood of 8 gal. per mile of track. Needle-valves adjust the heat to the growth of weeds.

During the first day of the experiment on the Aurora, Plainfield & Joliet Railway a heavy growth of weeds which had previously been cut with a scythe and was very dry was ignited by the burner and a small conflagration was started. However, on the second day of the trial, following a heavy rain during the night, no difficulty was encountered. As is the case with the chemical extermination the results of the process were not apparent until after three of four days, at which time the growth which had been subjected to the burner had dried up and charred, giving the roadbed a very clean appearance. The Lamb weed burner is available either on a rental or an outright purchase basis.

Bench-Type Drill Grinder

SEVERAL improvements have been incorporated in a new bench-type twist drill grinder recently placed on the market by the Gallmeyer & Livingston Company, Grand Rapids, Mich. A self-contained ½-hp. motor drives the grinder, consequently it may be placed in any convenient location in the tool room or on a bench.

The drill holder is so designed that either straight shank or taper shank drills of standard type can be ground. Drills with enlarged shanks or drills mounted in quick change sockets can also be ground without changes or extra adjustments. A swinging arm with diamond mounted therein is provided. This gives a convenient means of adjustment in the process of truing the wheels. For double-holder machines a truing device is furnished for both wheels, and a diamond is part of the standard equipment.

A safety stop is provided for the truing device in the form of a track on a movable section of the wheel hood. As the diamond is advanced into the grinding wheel in the process of truing it, this movable section of the wheel hood with its track is advanced an equal amount. It thus always remains a fixed distance from the face of the grinding wheel. A circular stop on the front of the drill holder abuts against the track and rocks thereon in the process of swiveling the holder. This is so adjusted as to bring the lip rest into close proximity to the wheel. At the same time it is impossible to get the front of the holder or the lip rest into the front of the grinding wheel where it could be ground off.

Twist Drill Grinder for Bench Mounting

On wet grinding machines the end of the drill being ground is flooded by a stream of water 1½ in. wide and about ¼ in. deep, which drops directly on the point of the drill. The water is carried to the special flat nozzle through a ¾-in. hose. Hoods, water pan and guard are provided so as to prevent the water dripping to the floor.

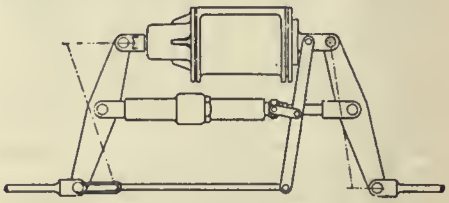
New Type of Slack Adjuster

A TYPE of slack adjuster for electric cars, which has been applied to several hundred on the Paris Metropolitan subway, is now being marketed in the United States under the direction of G. S. Albanese of Paris, who is now in New York.

This slack adjuster takes up the slack in infinitesimal steps as the brakeshoes and the wheels wear down. The principle of this adjuster is based on the action of two nuts on a single high pitched screw. One nut operates, while the other is an auxiliary. These nuts are provided with conical friction surfaces facing in one direction engaging conical seats. The seat corresponding to the operating nut is in the main body to which the operating effort is applied. The auxiliary nut seats in a separate sleeve which is movable in a longitudinal direction relative to the main body and is held normally by a spring in a definite position relative to this main body. This auxiliary sleeve is provided with stops which engage with a point which is fixed relatively to the truck. The screw rod is connected to the lever operating the brake as shown in the accompanying illustrations.

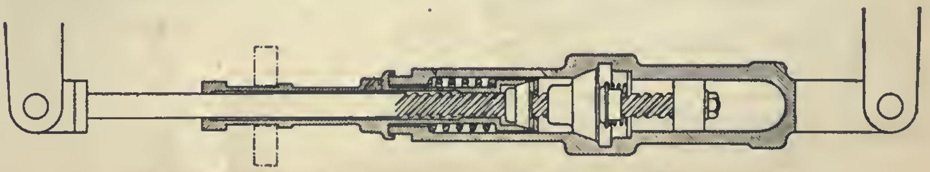
When effort is applied to the main body, the force is carried through the main operating nut, through the screw to the brake operating lever. The auxiliary sleeve moves together with the main body until it is limited by the stop. The movement of this sleeve corresponds to the normal clearance between the brakeshoe and the wheel. If there is any wear, it is evident that the main body will travel still further, and consequently will move relative to the auxiliary sleeve. When this happens, the auxiliary nut will follow the screw, until it strikes the back plate of the auxiliary sleeve, when it travels down the screw as long as the relative movement continues.

When the brake is released again, the main body as well as the sleeve moves back until the sleeve is prevented from moving any further by the stop, which thus limits the return of the brakeshoe to the normal clearance. The main body then continues its movement under the action of the spring until the normal position between the auxiliary sleeve and the main body is regained. During this movement, the main nut is released from its seat and is pushed by a back plate in the main body down the screw just as far as the auxiliary nut has been pushed down when the brake was applied.



Application of Adjuster to One Type of Brake Rigging

This completes the cycle and the wear is automatically taken up, whatever this wear may be. With this type of adjuster, the smallest fraction of wear will be taken care of automatically instead of step by step, as is the case with the usual ratchet arrangements. The entire mechanism is inclosed in a watertight housing, so as to protect it against the elements. Some installations have the chamber filled with a thick grease.



Two Nuts on a High-Pitched Screw Actuate This Slack Adjuster

The News of the Industry

Strike Averted

Increase of 3½ Cents an Hour Awarded to Men on British Columbia Electric Railway

Vancouver, British Columbia, lived for two days, Sept. 24 and 25, under the expectation of having to walk to work on Sept. 26. A board of conciliation, under the industrial disputes act of Canada, had been in session for several weeks, hearing both sides of the case in the controversy between the British Columbia Electric Railway and its men and on Sept. 24, before the board had made any report, the officials of the union announced that the men would go on strike two days later.

The reason given is contained in an ultimatum sent to George Kidd, president of the railway, as follows:

> As our representative, R. P. Pettipiece, has withdrawn from the conciliation board dealing with wages and working conditions of the street railway employees because he cannot agree with the other members of the board, we, the members of the joint advisory board of Division 101 Vancouver, 131 New Westminster and 109 Victoria, have no alternative but to carry out the instructions received from the members, and we hereby give notice that a strike will be called of all members of the three divisions to take effect on the morning of Wednesday, Sept. 26, at 5 a.m.

This letter was signed by seven members of the advisory board.

The industrial disputes act of Canada makes a strike on a public utility against the law if the men who are concerned go out before a conciliation board makes its report, and strikers are liable to fines up to $50 each for each day on strike. It is not known that these fines ever were imposed. The union went on strike in a similar way before a board could report in July, 1918.

On Tuesday, Sept. 25, the Mayor of Vancouver took steps to prevent a strike and after prolonged sessions, it was announced in the afternoon that a basis had been arrived at which was satisfactory to all three members of the board and which would be satisfactory to the men. The strike was thereupon called off.

The settlement, as later released by the Department of Labor, Ottawa, gave the motormen and conductors an increase of 3½ cents an hour from 58½ cents to 62 cents. All employees were reduced 10 per cent a year ago and now all others not mentioned above will receive an increase of 2 cents. Motormen and conductors will also receive 20 cents an hour additional when a run is not completed within ten hours of the commencement of the first shift.

The company contended that by the cost of living figures it was entitled to a decrease as wages were already the highest in Canada, although the cost of living was lowest. The men held out for increased pay so as to raise their standard of living, maintaining that $1,900 a year was necessary to keep an average family of five.

Saginaw Promised Service in November

Partial resumption of electric railway service will take place the early part of November, Charles S. Kressler, general manager of the Saginaw Transit Company, recently announced. Auxiliary bus service will start the same time and will gradually be augmented until the complete system is in operation. Track, roadway and overhead construction repairs are now being made and all of the rolling stock is being renewed and will be put in service, Mr. Kressler says, just as soon as it is 100 per cent ready.

Mr. Kressler is getting his organization together as rapidly as possible and has announced the appointment of George E. Cushman as transportation superintendent and Edwin Krueger as track and roadway engineer.

Orders have been placed by the company for bus equipment. The cost of this equipment is $122,000, which is $20,000 more than the company had contemplated expending for buses.

Because of the general breakdown of the jitney company that has provided transportation for Saginaw during the last two years Mr. Kressler will start the operation of street cars just as soon as one complete route is ready. The main route will be opened first for service and others, he says, will follow just as rapidly as conditions will permit. In two years the track, overhead and roadbed have deteriorated. Aside from the special work no new tracks will be laid now because it is impossible to obtain steel deliveries, Mr. Kressler says. However, orders have been placed for March 1 delivery.

Wage Arbitration Opened. — The hearing of the arbitration proceedings on the wage and working agreement of the Middlesex & Boston Street Railway employees has been opened. Charles H. Donahue, a Boston attorney, is acting as chairman and neutral arbiter, with President Pitt F. Drew representing the company and Attorney James H. Vahey representing the employees. According to Mr. Vahey, the men are seeking a wage of 66⅔ cents, a differential wage on the one-man cars; 20 cents an hour extra for snow work instead of 10 cents an hour; the inclusion of all employees under the time and a half rate for overtime; an eight-hour day for all employees. At the present time the average pay is 51 cents an hour for a nine-hour day.

New $100,000,000 Line

Engineer Turner Suggests to New York Commission Construction of Rapid Transit Line to Queens

The New York Transit Commission is considering the project of the construction of a new type of rapid transit line to be built through the center of a 500-ft. parkway, 10 miles long, in the undeveloped section of Queens lying between Flushing and Jamaica. The proposed route is from the west side of Manhattan eastward to the Nassau County border.

The commission a few days ago received an extensive report upon the subject by Daniel L. Turner, its consulting engineer, and has asked Mr. Turner to make additional studies looking to the further development of the idea.

In his report to the commission, Mr. Turner points out that there is no good reason why, in the sections of the city where land is relatively cheap, a rapid transit line may not be made the nucleus of a wonderful parkway line. His plan, as outlined, provides for the 500-ft. parkway strip approximately in the center of which would be the rapid transit line, running either in open cut or at grade, or, where the configuration of the territory demanded it, for short distances as an elevated railroad structure. Allowing about 50 ft. width for the railroad structure, approximately 175 ft. would remain for park treatment on either side, with a 50-ft. allowance for roadway and sidewalks on each side. Taxable values would increase by millions through the construction of such a line.

The route which Mr. Turner proposes is 17 miles in length, of which 4.37 miles would be subway, 1.1 miles under the East River would be in tunnel, 1.65 miles would be elevated railroad and 9.88 miles would be parkway line. The park area would be approximately 450 acres.

The construction cost of this line, Mr. Turner points out, would be $49,200,000. Adding to this the necessary interest, superintendence and administration costs and the equipment cost, the total cost is reached of $99,000,000. To build it as a subway now would cost $120,000,000, and later, in developed territory, much more. The line is proposed to begin as a two-track structure at the Nassau County boundary and extend as such about 7 miles to Seminole Avenue. From this point it will be a four-track line into Greenpoint, where the route intersects the proposed Brooklyn Crosstown line route at Greenpoint and Manhattan Avenues. The line will then pass in two single-tube tunnels under the East River, but on the Manhattan end, Mr. Turner points out, the line should be three-tracked. Eventually the line could be increased with additional tracks and spurs in Manhattan, additional tubes under the river and an extension of the four-track portion from Seminole Avenue out to the city line, as traffic develops.

Declaring that 27 square miles, approximately 25 per cent of the entire area of the Borough of Queens, is not accessible by any kind of rapid transit facilities, Mr. Turner states that this inaccessible area is largely the region lying north of Richmond Hill and Jamaica and to the south of Elmhurst, Corona, Flushing and Bayside. Most of this territory has no service at all, except that which is provided by the distant elevated lines to the north and south and the lines of the Long Island Railroad.

Queens, however, contains 36 per cent of the land area of the city, but has, with its 8 per cent of the population, only 8 per cent of the total rapid transit mileage of the city. Mr. Turner states that it is obvious that in its next rapid transit building program the city should provide additional rapid transit facilities for Queens Borough.

It is through the center of the open area that he has indicated that such a line should be built, the commission's consulting engineer states, and not into and through a section or sections already heavily built up. For the reason just mentioned he rejects the proposal to construct a line from Jamaica to Manhattan, and asserts that rapid transit lines should be built into undeveloped areas to relieve congestion. Additional lines into congested areas only augments congestion.

Dallas-Denton Electrification Delayed

The hearing has been concluded which was held to consider the motion to dissolve the temporary injunction granted several months ago by Judge Louis Wilson restraining the Texas Interurban Company from proceeding with construction. This company was organized by the Strickland-Hobson interests in Dallas to electrify the line of the Missouri - Kansas - Texas Railway from Dallas to Denton. The order of the court prevented the company from laying a double track on Fairmount Street, in accordance with provisions of the franchise granted by the city of Dallas. Judge Wilson announced that he would not render an opinion in the case for several days. Injunction was sought by the property owners along Fairmount Street, who alleged that the laying of a double-track interurban along this street would greatly damage their property and cause heavy reduction in property values.

Court action has been delaying the electrification of the Katy line from Dallas to Denton, for which plans and estimates have been prepared by engineers for the line, headed by E. C. Brown, chief engineer. It was originally planned to have the electrified line in operation by Sept. 1, but, due to court interference, it is not known now when the project will be completed, or if it will be undertaken at all at this time.

The electrification of the Katy to Denton was to be done by the Strickland-Hobson interests in fulfillment of their promise to the city of Dallas, at the time the franchise was granted in 1914, that two electric interurban lines, each at least 30 miles long, would be built out of Dallas within a specified time. Due to conditions resulting from the World War, extension of time was granted by the city of Dallas. The Dallas-Terrell line was built in fulfillment of the promise for one of the lines and the electrification of the Katy from Dallas to Denton was proposed in fulfillment of the promise for the second line. The electrification project, which it was estimated would cost in excess of $1,250,000, was approved by the city, and the company was preparing to begin construction when court action halted such preparations. Nothing further has been done, and officials of the company say they will await settlement of suit against them before anything further is done.

Sad Leave-Taking in Terre Haute

Employees of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., recently showed their appreciation for the services of E. M. Walker, general manager, who has left the company to accept the position of president of the Schenectady Railway. At a large gathering a farewell party was staged, at which Mr. Walker was presented with a handsome leather-bound set of the works of Robert Louis Stevenson, and also with a beautiful large silver loving cup. His helpmate, Mrs. Walker, was not forgotten. She was presented with an ivory set of the new Chinese game, "Mah Jongg."

The celebration was a surprise to Mr. Walker, who was not aware that the employees had been making preparations for the big farewell. In his six years' association with the men at Terre Haute they have learned to like him very much and to appreciate his kindnesses to them.

John T. Beasley, president of the United States Trust Company, presented the gifts to Mr. and Mrs. Walker. He said that, despite the short time that Mr. Walker had been in Terre Haute, he had established himself as one of the substantial men of the city; that he had faced a task when he went to Terre Haute that would have discouraged most men.

Mr. Walker, in expressing his appreciation, said the realization that his work was appreciated was one of the things that stirred a man to do all he could.

In referring to Mr. Walker's leaving the company an editorial in the Terre Haute *Tribune* paid a real tribute to his activity as a traction manager. In part that paper said:

> Mr. Walker's methods did not concern the politician. He rather dealt with the makers of new and better cars, and instead of looking for propaganda, he occupied himself with building up an organization among his men and employees generally, the one aim of which was perfect street car service. A spirit of courtesy has marked every branch of the corporation, to such an extent that it has been a matter of comment by visitors to the city, and the company cheerfully has participated in legitimate helpful civic and commercial matters, enhancing the happy relations between the public and the corporation.

Charleston Survey Completed—Increased Fare Recommended

The Beeler organization has completed the survey of the electric railway situation in Charleston, S. C. The report has been in preparation since early in May, when the Beeler organization, at the request of the Charleston Consolidated Railway & Lighting Company, undertook to make a traffic survey of the situation and offer recommendations which it believed would help toward bringing the company back on a good financial basis.

One of the first recommendations, as suggested by the experts, calls for an adjustment in fares, which it considers necessary in solving the problem in that city. It points out that the average rate of fare of eighty-one railways for the first four months of 1923 was 7.13 cents, and the average rate of fare charged in the city of Charleston was 6.02 cents.

In addition to the fare increase recommended, the organization further suggested a modification in the routing of lines, with a few excepted. It recommended the abandonment of certain small portions of the railway system which do not contribute a sufficient amount of revenue to justify their operation. It recommends, further, the complete relief to the company from the cost of paving between the tracks, except where such paving is damaged by the railway in its operations. Faster schedules are recommended on all lines, that the patrons may be given prompt and efficient service. It suggests that, if necessary, relief be granted in the matter of taxation, as has been done in some cities. It brought out the fact that while the number of passengers in 1922 was about the same as the number carried in 1912, the taxes of 1922 had more than quintupled during the last ten years.

Other minor recommendations were made, looking toward the solution of the traffic problem. The report states that substantial savings would be effected in operating costs by the adoption of these changes. It is indicated further that it would be impossible to put the operation of the railway upon a sound financial basis until such time as a substantial increase in the traffic carried could be experienced. It was the hopeful opinion of the engineers who made the report that Charleston was to experience, in its industrial and business conditions, a great improvement, which would be helped along by the changes in car routing and service recommendations.

Active Safety Measure Campaign Under Way in Los Angeles

The July traffic injury record of Los Angeles was broken when reports showed 634 persons were injured, seventeen being killed, as compared with 466 injured in July, 1922. Since Jan. 1, 1923, 310 persons have been killed in traffic in Los Angeles.

The press in Los Angeles during the month of July undertook a campaign of attempting to arouse the people to the need of more safety measures to eliminate dangerous grade crossings and the adoption of improved traffic laws and rules to lessen the loss of human life.

None of the laws in the State is broad enough to enable the Railroad Commission to order a separation of grade of highway and railway lines with respect to fixing the portion of cost to be borne by each concerned. Neither can this adjustment be legally arranged by handling such work under improvement acts and assessing the adjoining property. It rests with state, county and municipality officials to get together with the taxpayers and railroads and work out the desired plan to eliminate these hazards.

D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, said that his company was doing everything possible to prevent accidents at grade crossings; that it had installed along the lines, at 304 crossings, automatic wigwags, and that the company would soon commence the installation of sixty more. The company was arranging to install additional standard crossing signs at 1,000 crossings not so frequently used. He said that he was willing to join in conference and co-operate with the commission, city authorities and the Automobile Club of Southern California in order to prevent accidents between trains and automobiles. His company had agreed to pay its share for the separation of grade crossings along the Los Angeles River, for which the city of Los Angeles voted bonds to the extent of $2,000,000 at the last June election and as soon as he was authorized to do so construction of a tunnel and terminal under Pershing Square would be started at a cost of $4,200,000, and if denied use of Pershing Square, the terminal would be placed on Hill Street between Fourth and Fifth Streets, as originally planned. The building of this tunnel will eliminate twenty-one grade crossings for interurban trains.

Judgments Enacted Affect Oklahoma Utilities

The people of the state of Oklahoma have recently enacted judgments binding upon the public utilities in that state. The opinion states that in all hearings before the corporation commission to fix, raise or lower the rates charged by any public utility, of which the Corporation Commission has jurisdiction, the state shall be considered a party to said action adverse to that of the particular public utility in question and it shall be the duty of the Corporation Commission before it enters an order to fix, raise or lower the rates of this public utility, to enter a judgment finding and fixing the value of the property of the utility.

On the matter of the utility submitting a report on the value of its property, the opinion states that the report when filed shall be considered by the commission as a confession of judgment and upon receipt of the statement the commission shall enter a judgment in an action in which the state shall be the complaining party and the public utility in question shall be the defendant or respondent finding the value of said property as stated in the said confession.

If the Corporation Commission desires to dispute the value of the property the commission shall set the matter for hearing and notice of this hearing shall be given to the public utility. The right to modify the judgment of the Corporation Commission has also been provided in Sec. 4 of the judgment, which states that the Corporation Commission shall have full authority at any time upon due notice to said public utility to modify the judgment provided for in the preceding section, and may modify the same upon application of the public utility after due notice of hearing.

The opinion defined a public utility.

Niles and Company in Controversy

A temporary injunction has been granted restraining the city of Niles from further tearing up the tracks of the Pennsylvania-Ohio Power & Light Company. Court action was started by the railway following the cutting of the track leading to Girard and Youngstown. The tearing up of the tracks came as the result of a bitter fight between Niles and the West End Traction Company, a subsidiary of the Pennsylvania-Ohio Power & Light Company, over the question of repaving Robbins Avenue. The company claims that it is financially unable to pay for this improvement and further that it is attempting to negotiate a new franchise calling for a higher rate of fare that would put the West End company in a position to meet the paving bill. In commenting on the situation President MacCalla of the Pennsylvania-Ohio stressed the fact that he had no desire to abandon railway service through Niles and replace with bus service because he said that buses could not handle volume traffic.

Statistics of the Industry

Census Bureau Gives Out Figures on Passengers Carried in 1922 in Connection with Atlantic City Convention

Although there were approximately 12,000,000 automobiles in the United States last year, the electric railways of the country carried more passengers in 1922 than ever before in the history of the United States Census Bureau. The total number was 15,317,687,212.

This fact was announced on Oct. 6 by the secretary of the American Electric Railway Association, on authority of the Census Bureau, which has just completed a survey of the electric railway operations for 1922. These figures have been released in advance by the Census Bureau for use in connection with the association's convention. They should be considered as preliminary only and are subject to possible correction by the Census Bureau.

The largest number of passengers carried previous to 1922 in any census year was 14,506,914,573, carried in 1917. Thus, 1922 shows an increase of about 6 per cent. The report for 1922 also showed that electric railways operating buses carried about 15,000,000 passengers.

Passengers carried by states in 1922, with the 1917 figures, are as follows:

TABLE SHOWING TOTAL PASSENGERS CARRIED ON ELECTRIC RAILWAYS, BY STATES

	1922	1917
Alabama	80,583,684	84,962,155
Arizona	5,776,976	7,893,924
Arkansas	34,131,000	30,525,360
California	935,446,247	638,632,142
Colorado	100,764,698	102,882,744
Connecticut	209,129,169	249,452,728
Delaware	25,889,902	32,648,315
Dist. of Columbia	197,406,744	165,445,889
Florida	49,220,967	38,625,356
Georgia	130,718,221	114,021,766
Idaho	3,497,888	3,560,462
Illinois	1,753,500,547	1,665,552,944
Indiana	262,320,348	231,290,386
Iowa	110,406,523	119,348,038
Kansas	43,575,343	46,212,673
Kentucky	147,490,154	141,218,932
Louisiana	164,593,374	134,017,669
Maine	55,575,075	61,789,846
Maryland	350,024,448	315,969,539
Massachusetts	1,058,708,495	1,219,706,121
Michigan	576,823,922	593,096,656
Minnesota	352,464,915	316,904,581
Mississippi	9,441,459	12,215,749
Montana	17,522,464	25,948,387
Missouri	692,747,054	660,703,957
Nebraska	97,566,736	95,782,721
Nevada	487,200	890,471
New Hampshire	22,270,122	26,341,020
New Jersey	484,084,796	555,286,203
New Mexico	1,494,480	1,594,543
New York	3,311,252,940	2,951,805,264
North Carolina	34,206,694	32,140,967
North Dakota	3,616,069	3,063,647
Ohio	967,969,914	1,034,245,928
Oklahoma	42,322,202	35,820,508
Oregon	97,246,645	91,926,694
Pennsylvania	1,662,796,825	1,520,378,517
Rhode Island	144,960,937	128,220,984
South Carolina	22,338,616	28,408,318
South Dakota	2,273,666	2,105,626
Tennessee	130,767,681	122,655,470
Texas	229,165,045	184,912,268
Utah	39,303,737	47,671,180
Vermont	7,372,195	9,268,385
Virginia	139,049,282	135,411,909
Washington	173,728,486	186,361,737
West Virginia	95,989,610	80,920,697
Wisconsin	238,963,176	217,599,493
Wyoming	690,541	1,475,704

Subway Plan Revised

Change in Subway Scheme in Los Angeles Presented to Council by Board of Engineers

Los Angeles engineers have submitted to the City Council alternate plans which provide for the construction of a vast underground railway system with central stations extending from the present Hill Street Terminal of the Pacific Electric lines along three blocks between Fifth and Eighth Streets on Olive Street. This report of the city engineer and the chief engineer of the Board of Public Utilities sweeps aside the many proposed subway system plans that have previously been submitted.

The report further recommends that the proposal previously made for a central terminal under Pershing Square be abandoned, but that the Pacific Electric be permitted to construct under a section of the square in such manner that the present appearance of the park will not be disturbed.

The City Council is urged to appropriate funds for an immediate complete survey for working out detailed plans for the proposed subway system, which is to meet demands imposed by unprecedented growth of the city of Los Angeles and southern California towns. It is outlined that the great need for the subway is evidenced in reports showing that the Pacific Electric Lines are now handling 196,000 passengers daily and the Los Angeles Railway Lines 210,000 daily along routes of a suggested subway system.

The former proposed plans for a Pershing Square terminal are declared completely inadequate; that the capacity of such a system would not be sufficient even by the time this project would be completed.

It is cited that the advantages of this proposed plan is with a view of more than doubling the downtown station capacity, in addition to assuring the preservation of Pershing Square Park, as well as establishing a grade for the immediate construction of the Hollywood tunnel. As preliminary steps, the report states that the Pacific Electric must acquire a new right of way through the Hollywood district, and the City Council must take measures to cause the city charter to be amended to permit construction of subways in any streets or alleys at any levels consistent with efficient operation.

The report also included a city-wide subway system plan which would enable the Pacific Electric lines to route a large part of its interurban traffic from the center of the city along underground channels. The plans outlined that four main projects be built soon.

In view of the fact that a short stay of time is necessary to work out the detailed plans of the Olive Street subway stations, the city is urged to obtain from the State Railroad Commission a stay of its order requiring the Pacific Electric to construct its subway from First and Glendale Boulevard into the present Hill Street terminal at grade, the extension not to exceed ninety days.

The report further contains recommendations that the vast subway system care as far as possible for local traffic.

Wants Privilege Accorded Seattle Municipal Railway

The Seattle & Rainier Valley Railway has served notice on the city utilities committee of the City Council that it will request the city of Seattle to abolish the gross income tax levied against the company under its franchise and also the requirement that the line carry policemen and firemen without charge.

John C. Higgins, counsel for the company, appeared before the committee to oppose a Council bill requiring the company to pave its right-of-way in Rainier Avenue between Graham and Morgan Streets, saying the company had laid planking several years ago, which is still in good condition, and that the Council in 1917 had relieved the company temporarily of the paving obligation, except in certain blocks.

The company's counsel explained that free transfers were now being given on the line and that it was accepting school tokens the same as the municipal railway. In consideration for these concessions, he said, the Rainier Valley line should be treated on a parity with the Municipal Railway as to paving. Mr. Higgins stated that the free transfers and school token privileges are costing the company 39 per cent of its net revenue and that the company is not earning a profit.

Co-operation Sought for Houston-Seabrook Interurban

All contracts involving the city of Houston, the Houston Electric Company and the Galveston-Houston Interurban Company relating to the construction and operation of an interurban electric line from Houston to Seabrook, a resort on the shore of Trinity Bay, have been executed, according to a statement made public by the trustees of this undertaking. The trustees appeal to the citizens of Houston to cooperate to the end that construction may begin soon after Oct. 1, 1923, as provided in the articles of agreement by which the undertaking was launched.

The purpose is to incorporate the Seaboard Electric Railway to construct and operate an electric interurban railway from Houston via Harrisburg, Pasadena, San Jacinto Battle Park, Morgan's Point, along the Houston Ship Channel, and thence along the bay shore to Seabrook. The company will have an authorized capital of $2,000,000, consisting of 10,000 shares of 7 per cent cumulative non-voting preferred stock of the par value of $100 a share and 10,000 shares of common stock of the par value of $100 per share. Of this company it is provided that John H. Kirby, W. C. Munn, John S. Bonner, J. M. West, J. S. Rice, I. A. Cottingham, and Jacob F. Wolters will be among the initial directors.

Railway Ethics Compulsory in Cape Breton

A twentieth century version of the beatitudes was recently given out by the Cape Breton Electric Company, Sydney, N. S., and distributed in circular form to the passengers of the line. The company seeks to relieve congestion in railway traffic and the circular, as a way of doing this, is attracting much attention. The circular reads as follows:

> He who spreads himself out across the aisle shall be humbled and he who strives to make room for his fellow men shall be exalted.
>
> Blessed is he who giveth up his seat to a lady, but scorned shall be he who hideth himself behind his paper.
>
> He who standeth upon the platform and emitteth poison gas from a noxious weed is an abomination unto his fellow passengers.
>
> The wrath of many who wait shall descend upon the head of him who hath not his fare ready.
>
> A wise one is he who goeth forward in the car, for he shall be rewarded with a seat.
>
> Blessed are those who have their transfer unfolded, for by such is the service improved.

Abandons Pleasure Park Plan

The Philadelphia Rapid Transit Company has abandoned its plan for an amusement park at Sixty-third and Market Streets, Philadelphia. The property has been ordered sold by the owners, the Willow Grove Amusement Park Company. After much opposition to the plan voiced by residents along the way, legal action was taken, with the result that Judge Johnson handed down a permanent injunction against the railway forbidding it to establish a pleasure resort on the ground that it would constitute a nuisance to residents of the community. It was decided not to appeal.

A Story with a Moral

Honest business men can become blackguards and crooks in the eyes of the public if they enter the public utility field. Just what the attitude of people in general is toward utilities and their operators is aptly expressed by W. M. Maupin in a recent editorial in the Gering (Neb.) *Mid-West*. "The Story of Three Men in a Fix" related the experiences of Plodder, Figgers and Smithers, who, with extraordinary perseverance, became the most respected and beloved business men in Billville and after amassing a fortune settled down to a life of ease and comfort. They were too ambitious for that kind of a life, though, and set to work to perform their greatest achievement—to give the residents light, power and a transportation system. They organized the Billville Electric Railway, Light & Power Company and in a few years made Billville a real city, the epitome of industry. But how they stood in the community now was a very different story. As individuals they were respected and admired, but as public utility operators they were condemned and despised. The moral of this, in the opinion of the writer, is "Don't it just beat hell?"

Official Improving.—The condition of George L. Maltby, general manager of the Jamestown Street Railway, Jamestown, N. Y., who has been dangerously ill, continues to improve steadily and his friends look for a speedy recovery.

Compromise Agreement Reached.—A wage compromise between the Board of Works and the platform employees of the San Francisco Municipal Railway provides for an increase of 40 cents a day. The new scale is retroactive to Sept. 16. The men had asked for $1 a day increase, and under the new arrangement will be paid $5.40 for an eight-hour day.

Asks $576,706 for Bridge Operation.—Commissioner Whalen of the Department of Plant and Structures, New York, N. Y., in a supplementary budget has asked for $576,706 for operating the Williamsburg bridge trolley system. Of this amount $320,870 is for personal service and $203,931 to operate trackless trolleys, of which $113,108 is for personal service.

Nutshell Economics to Appear.—In the weekly "Service Talks" of the Philadelphia Rapid Transit Company a series of discussions has been started under the heading "Nutshell Economics." The first appeared in the Sept. 12 issue of the pamphlet and was called The New Era in Labor. The article tried to show the difference in attitude between capital and labor today and fifty years ago.

New Slogan in St. John.—The New Brunswick Power Company, operating the street railway in St. John, N. B., has turned attention to the education of public sentiment. The company has started an advertising drive, with the slogan of "Assured Service." A recent bulletin says: "We appreciate your patronage. Let us make it reciprocal. We are always at your service. Thank You. We are on the job twenty-four hours a day."

Mr. Chapin Entertains Railway Men.—Each year for a number of years past Edward H. Chapin of Rochester, vice-president of the National Car Wheel Company, has given a summer outing and dinner at his beautiful summer home at Geneseo, in honor of the officers and department heads of the New York State Railways, Rochester Lines. This year the event took place on Sept. 27. After gathering at Conesus Lake there was a dinner at East Avon. About a hundred guests were present.

Men on Strike.—Trolley service has been at a standstill in Mahonoy City since Oct. 2, when motormen and conductors employed by the Schuylkill Railway went on strike because the company refused to accede to their demands for an increase in wages amounting to 10 cents per hour. The company had asked the men to accept a decrease of 5 cents per hour, and later came back with a counter proposition to "split the difference" and agreed to add 7½ cents to the minimum rate per hour, which is 50 cents.

Foreign News

Le Havre Replaces Cog Railway with Moving Stairway

Throughout Europe, as in many places in the United States, there have been established funiculaires, or cog, railways, climbing from some low level to a neighboring height. A new suburban development at Le Havre, on the Norman coast of France, has gone one better and suppressed the very thought of the funiculaire by a project for the installation of a magnified moving stairway of 300 steps. There will be two sets, one going up, the other going down, the motive power being electricity. The steps, or *paliers*, will each be wide enough to take a baby buggy or a bicycle. There is nothing especially new in the idea, but there is in its application, and the Compagnie de Tramway Funiculaire at Saint Adresse saw here at Graville the opportunity of giving a similar service at a less cost of operation and a no greater cost of installation. Nothing is said of upkeep in the sense of repairs or replacements. It would seem, however, that this is a factor which should be given due consideration. Operating and upkeep figures after a term of years as compared with those of the neighboring funiculaire will make interesting reading.

The proposition came from an Alsatian engineer.

Genoa, Italy, to Have Underground

A new company has been formed at Genoa, the Societa Metropolitana di Genova, for the construction and exploitation of an electric underground railway running from Sampierdarena on one side of the city to Quarto on the other side. The line is to be so built that it may be extended as occasion may require, at ground level.

The company is capitalized at 5,000,000 lire, all paid up and in the hands of the promoters. The charter provides for an increase of the initial capital to 80,000,000 lire. The promoters of the enterprise are the Marquis Stefano Cattaneo Adorno di Luigi and the engineer, Emilio Rava. Aside from these, who are Italians, the rest of the principal stockholders are Spanish.

The "engineer-president" of the company is Senor Roberto Farjon y Farjon. His staff of associates are all Spanish.

The *Critica*, the organ of the railway and transport interests, announces that this group of Spanish capitalists forms a part of the consortium which is carrying out the subway projects of Madrid and Barcelona, and that its participation in this Genoa project marks its first venture into foreign fields.

Dr. Charles A. Beard Will Aid in Reconstructing Tokyo

Dr. Charles A. Beard, economist and authority on municipal government, has left for Japan to aid in the rebuilding of the ruined cities. Dr. Beard goes as a representative of the Bureau of Municipal Research. Dr. Beard was invited by Viscount Shimpei Goto, Minister of Home Affairs, to help in the reconstruction of the devastated territory. The bureau will meet all the expenses of his mission. Dr. Beard, speaking on questions of transportation, said that three subway companies had been organized in Tokyo before the earthquake, but that he did not know what effect the disaster would have on subway construction. He said the plan would be to enlarge the city of Tokyo to seven times its present area, so as to include all the outlying districts. He said that a conference had been held with the New York City Planning Committee of the Russell Sage Foundation to discuss reconstruction plans. It was his belief that there would be some difficulty in reconciling the views of the Japanese conservative element and the younger progressives in planning reconstruction.

©Wide World

Ginza Avenue, Tokyo's Fifth Avenue, After the Fire and Flames Had Subsided

Financial and Corporate

"Stew in Their Own Juice"

Court So Declares of Some St. Louis Bondholders and Moves to Lift Receivership

Lifting of the receivership and a forced reorganization of the United Railways, St. Louis, as an immediate prospect are indicated through a decision handed down by Federal Judge Faris on Sept. 29. On that date the court denied the receiver's application for extensions of three underlying bond issues totaling $4,100,000 and two bond issues of the St. Louis & Suburban Railway, a constituent company, totaling $6,500,000.

Default in the payments due on Oct. 1 on these bond issues automatically brings about a default in the $30,000,000 issue of United Railways general 4s, which otherwise would not mature until 1934. Attorneys of the Suburban group of bondholders announced that they would institute foreclosure proceedings before Oct. 6.

Confusion exists among the various groups of security holders. Following Judge Faris' decision, there were conferences late Saturday and over Sunday, and efforts were made to get in touch with the bond and stock holders. The Suburban group has announced that it had offers from outside interests to segregate and take over the lines covered by the mortgages on that property. Others contend the Federal court and the Missouri Public Service Commission will never consent to disintegration of the system.

In handing down his decision Judge Faris said:

> The questions involved are whether the receivership, which has been here for four and a half years, should not be terminated and whether the Suburban bondholders should be forced—to use the vernacular—"to stew in their own juice," taking 4 per cent while others more favored are able to get extension after extension from month to month and year to year, at 8 per cent or better.
>
> It is inequitable, it is unjust, it is unthinkable. This case has been here long enough, and the facts, as they present themselves to the court, induce me to reach the conclusion that I ought not to order these extensions. Concerning the issuance of additional receiver's certificates—there are enough receiver's certificates at issue now. The foreclosure and the reorganization would rid the company of much underbrush and the new company will be able to begin life under much more favorable skies.

The underlying bond issues for which three-year extensions were sought were Lindell Railway, Cass Avenue & Fair Grounds, Compton Heights, Union Depot & Merchants Terminal, and the Suburban. The Suburban lines were the last to enter the United Railways system. Prior to 1906 they were operated separately from the United Railways. One of the Suburban bond issues of $2,000,000 matured April 1, last, and the six months grace period expired on Oct. 1. On the same date the two other issues totaling $4,500,000 matured. The Suburban lines are the present Hodiamont, Sarah Street, Union, Manchester, Meramec and Kirkwood-Ferguson. The Hodiamont is an east and west line through the heart of the city and much of the distance is through its own private right-of-way.

Attorneys for the Suburban group, who alone opposed the bond extensions, declared they did not want segregation, but did want foreclosure and a reorganization. They indicated, however, that segregation might become necessary. Attorneys Jeffries and Early stated that their foreclosure petition would be filed not later than Oct. 6.

The Suburban interests contended that when the receiver recently invited financial interests to underwrite the various bonds and the proposed extensions he received proposals for underwriting the underlying bond issues, but none to underwrite the Suburban issues. It was to this matter that Judge Faris referred when he said the Suburban group were left to "stew in their own juice." Attorney Jeffries would not hazard a guess as to how much time will be required to bring about a reorganization. After foreclosure it will be a matter for the security holders to pass on, subject to approval by the court and the Public Service Commission.

CITY'S STAND ALTERS CASE

Receiver Wells declines to discuss the decision by Judge Faris. In the opinion of others, however, a reorganization would have taken place months ago had it not been for the fight the politicians made upon the valuation. When the Missouri Public Service Commission decided the property was worth $52,000,000 the city appealed, and then the company also appealed. It might have been possible to reorganize the property on the $52,000,000 valuation, but in view of the city's fight the case now is on its way to the United States Supreme Court. The underlying and junior bonds total $50,690,000, and in addition there are receiver's certificates outstanding of a total of $4,200,000. The satisfaction of these claims in full would leave nothing for the stockholders. The preferred stock totals $16,383,000, and the common stock $24,913,000. A majority of the common stock is held by the North American Company and is carried on the books of that company at $1. The North American Company, however, is the owner of substantially all of two of the underlying issues—$1,474;000 Lindell Railway first 4½s and $1,640,000 Gass Avenue and Fair Grounds Railway first 4½s—and has expressed its readiness to extend beyond Oct. 1 their present maturity dates.

Just two days before the decision by Judge Faris, the Missouri Public Service Commission announced that a conference of all interested parties would be called with a view of hastening a reorganization of United Railways. In the light of subsequent events it is not known whether the commission will insist upon a conference. In the meantime the commission had approved the receiver's request that the underlying bonds be extended, and that $4,200,000 of receiver's certificates be issued. A formal statement was issued as follows:

> The commission feels that a reorganization of this property should be effected as soon as possible. The expenses necessarily incident to the receivership are very great and inevitably impose a constantly increasing burden to the system, disadvantageous both to the property and to the public. The commission has no power directly to bring about a reorganization, but it desires to do all it can to effect that result. A conference of all the interested parties will therefore be called for an early date looking toward a hastening of reorganization.
>
> The question of reorganization was discussed before the commission on Friday in connection with the receiver's application for permission to extend the maturity date of the bonds. Morton Jourdan, representing the North American Company, said the company had submitted a reorganization plan some time ago, but nothing came of it. Receiver Wells said he had tried to work out a reorganization plan, but had not met with success.
>
> It was evident at the hearing that the security holders of the St. Louis & Suburban Company would like to see that property, which includes the Hodiamont line, separated from the main system and left to work out its own salvation. It was likewise clear that the receiver and the North American Company will oppose any plan of reorganization which provides for separating the various street railway lines which now form the system.

The protest filed by the attorneys representing bondholders of the Suburban Company against the extension of the maturity of the $4,100,000 bonds was not mentioned in the statement by the Public Service Commission. One of the points advanced by the Suburban bondholders was that an extension of the underlying bonds would tend to delay the reorganization. They also claimed that the fact that the United Railways is not satisfied with the valuation of the property as fixed by the commission is no justification for the continuance of the receivership.

The commission also said:

> It is necessary, therefore, for this commission to act at once upon the application. The receiver and other parties have represented to the commission, that if this plan [for bond extensions and receiver's certificates] be not allowed to be carried out, dismemberment of the present railways system in St. Louis probably will result. The City Counselor of St. Louis has joined with the receiver in urging upon the commission the approval of the application. The holders of practically all of the securities have urged upon the commission the desirability of this course. There has also been filed with the commission the recommendation of Judge Henry Lamm, special master under appointment from the Federal court, recommending the authorization prayed for by the receiver.
>
> The commission has decided to grant the application in view of the various representations made to it by the interested parties, including the city of St. Louis, and in view of the emergency requiring immediate action. Accordingly an order has been issued approving the application.

All of which was nullified by the decision of Judge Faris.

$155,491,555 of Issues Approved in Ohio

Security issues totaling $155,491,555 were authorized by the Ohio State Public Utilities Commission during the year ended July 1, 1923, for the purpose of continuing, extending and improving public utility services for the people of this State. That is one of the high lights in the report of the commission's work, just issued.

Of the capital security issues authorized by the commission, $96,286,334 represented bonds and notes, while the amount of stock totaled $59,205,220. The commission in its report also points out that during the year its bureau of rates and service had before it 1,206 informal complaints, of which 1,138 were adjusted to the satisfaction of both parties. In fifty-five proceedings filed by shippers of freight for overcharges, the commission ordered refunds amounting to $55,438.56.

During the year 243 formal orders were issued by the commission and forty-nine supplemental or modifications of previous orders were promulgated.

Among the numerous matters acted upon by the commission in the year were 112 applications to approve new capital expenditures, fifty-six applications for property transfers, involving a money value of $51,546,929, thirteen applications to abandon public utility services, sixteen appeals from rates fixed by ordinance in municipalities, forty-three complaints against utility services being rendered, and hundreds of other matters involving such things as safety gates at railroad crossings, rules and regulations for overhead and wire crossings, extensions of passenger train service, orders regarding coal car supply, and thousands of other details referring to filing of schedules and investigations, etc.

Reorganization Requirements of B.-M.T. Met.

With the sale of approximately $4,500,000 in shares of stock of the Brooklyn-Manhattan Transit Corporation to private buyers, the $26,000,000 required under the reorganization plan has been paid into the new company.

In the official statement issued by Gerhard M. Dahl, chairman of the executive committee of the corporation, he said:

> Brooklyn Rapid Transit Company Underwriting Syndicate will be terminated successfully Oct. 5. Eighty-two per cent of the stockholders paid their assessment and received therefor the new securities provided for by the plan. The balance has been placed privately and the syndicate subscribers relieved of their liability.

The syndicate, headed by the Chase Securities Company, was opened on March 15 and underwrote the $26,000,000 to be paid in by the stockholders under the reorganization plan. The payments were made by the stockholders in three installments. The time expired several weeks ago in which the holders of the stock of the Brooklyn Rapid Transit Company were authorized to purchase the shares of the Brooklyn-Manhattan Transit Corporation.

The $26,000,000, which has been paid into the company through the assessments as the result of the reorganization plan, is to be used in providing cash requirements, and $5,000,000 in capital requirements, a part of which has already been appropriated for the purchase of new equipment.

Denver Fare Case Closed in U. S. Court

In the United States District Court of Colorado A. L. Drum of A. L. Drum & Company, Chicago, closed the case of the Denver Tramway, which has been in progress since March, 1923, before Special Master Henry A. Dubbs, appointed by the United States Court.

This is the first large street railway system to conduct a confiscation case originating in the United States Court, necessitating the presentation *de novo* to the court of all details of inventory and valuation with detailed testimony as to the principles of valuation adopted with respect to the basis of reproduction costs, depreciation and the cost of development as measuring the going concern value of electric railway properties. Usually the valuations are fixed by the public service commissions and reach the Federal court only on appeal. The decision in this case by the court will, therefore, be of great interest to all other electric railways.

In the JOURNAL for June 9 details of the valuations prepared by A. L. Drum & Company were printed. These valuations which were submitted summarize as follows:

SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE DENVER PROPERTY AS OF DEC. 31, 1922

	Present-Day Cost Prices Current Dec. 31, 1922	Three-Year Average Cost Average Prices 1920-1922
Total physical property	$27,330,568	$29,071,181
Going concern value...	4,000,000	4,000,000
Water rights..........	290,662	290,662
	$31,621,230	$33,361,843

Dr. Delos F. Wilcox, retained by the city of Denver, submitted valuations summarizing as follows:

	Normal Reproduction Cost Basis	Reproduction Cost at 1922 Prices
Total cost, new........	$12,051,260	$16,997,710
Total cost less depreciation..............	7,215,229	9,356,454

The company has been operating under an 8-cent fare with a 7½-cent ticket fare since March, 1921, under order of the Federal court, and the city is endeavoring to have this fare reduced to 6 cents, which the company contends will be confiscatory.

Arguments by attorneys for the company and the city will be heard on Oct. 8 by the master.

Auction Sales in New York.—At the public auction rooms there were no sales of electric railway securities this week.

Receivership Application Dismissed.—Vice-Chancellor Backes has dismissed the application of William Harris for a receivership for the Public Service Railway, Newark, N. J.

Authorizes Preferred Stock Issue.—The West Penn Company has authorized an issue of $50,000,000 of 7 per cent cumulative preferred stock and has afforded holders of its 6 per cent preferred stock an opportunity to convert share for share into the new 7 per cent preferred stock. This privilege has also been extended to preferred holders of the West Penn Railways.

Reports Surplus. — For the twelve months ended Aug. 31, 1923, the North American Company, including subsidiaries, reports a surplus of $13,701,719, after taxes, interest and preferred dividends, but before consideration of depreciation, which was equal to $5.65 a share on 2,426,464 shares of common stock.

Another Move Against "L" Consolidation.—The preferred stockholders of the Chicago Elevated Railways have filed a petition with Judge Hugo M. Friend in the United States District Court asking for a temporary injunction to restrain company from selling $14,000,000 stock certificates. Argument on the petition will be heard on Oct. 9.

Authorizes Trust Certificates. — The San Diego Electric Railway has been authorized by the California Railroad Commission to issue $712,000 of 6 per cent equipment trust certificates and to execute a mortgage as security for the payment thereof. The equipment to be purchased with the proceeds of this issue includes fifty double-end, double-truck, four-motor electric street cars and ten Fageol coaches, costing $950,000. The order for the cars was placed some months ago and was referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 21, 1923.

Funding Bonds Offered.—Hill, Joiner & Company, Payne, Weber & Company and Halsey, Stuart & Company, Inc., are offering at 97 and interest, to yield about 6¾ per cent, $1,150,000 of first lien and refunding mortgage 6½ per cent gold bonds of the Eastern Wisconsin Electric Company, Oshkosh, Wis. The bonds, known as series B, are dated Sept. 1, 1923, and are due Sept. 1, 1948. The proceeds will be used towards the retirement of underlying bonds amounting to $1,182,000 of the Eastern Wisconsin Railway & Light Company's first mortgage 5s. due Oct. 1, 1923.

No Revision in Exchange Plan.—In a recent letter sent to the shareholders of the Quebec Railway, Julian C. Smith, president of the Quebec Power Company, states that the holders of the Quebec Railway, Light, Heat & Power Company need expect no change in the basis of exchange for shares of the Quebec Power Company when their concern is taken in. He says that the management of the Quebec Power spent many months in study and examination with a large staff of experts in order to arrive at a proper value for the income bonds and shares of the Quebec Railway and that nothing has developed since which would in any way modify the conclusions arrived at. He therefore advises the shareholders that the management of the Quebec Power will make no change in the offer which was contained in its letter of July 26, 1923. The financial conditions under which the companies are to merge have been outlined previously in ELECTRIC RAILWAY JOURNAL.

Traffic and Transportation

Mr. Dalrymple in Chicago

Interesting Side Light by Glasgow Manager on British and American Methods

James Dalrymple, general manager of the Glasgow Municipal Tramways, who was brought to Chicago by ex-Mayor Edward F. Dunn in 1905 to give his opinion of municipal ownership of the street car lines, has been in Chicago for the past two or three days inspecting the surface lines and conferring with the Mayor. The corporation of Glasgow sent Mr. Dalrymple to America and Canada this time to collect ideas, information and data of benefit to its tramways.

Mr. Dalrymple has visited Montreal, Vancouver, Seattle, San Francisco and Los Angeles and will inspect the Detroit municipally operated street cars on his travels from Chicago to the East. He plans to attend the American Electric Railway Association convention in Atlantic City.

It will be remembered that Mr. Dalrymple was very much opposed to municipal ownership for Chicago eighteen years ago, giving as his reason that politics would interfere too much with such operation. The Glasgow manager did not express himself at this time relative to whether or not he thinks Chicago is now ripe for municipal ownership. He gave some very interesting statistics on the Glasgow Tramways which make it possible to arrive at some comparison between his property and properties here in the United States on which municipal ownership is advocated.

AVERAGE HAUL 1.9 MILES

Operating 209 miles of single track in the city of Glasgow, the average fare is 2.58 cents, and the cost of operation per passenger 1.8 cents. In the fiscal year of 1922 296 rides were made per capita, while the passengers per car-mile were 15.5. Some idea of the size of the property may be gained from a comparison of the average haul per passenger, amounting to 1.9 miles in Glasgow, against 4.16 miles on the surface lines in Chicago and 6.95 miles on the elevated of Chicago. The Chicago Surface Lines give a ride of 35 miles for a 7-cent fare as compared with a 6.84 mile haul for a corresponding 7-cent fare in Glasgow.

A zoning system of fares introduces rather a complicated system of fare collection necessitating the conductor or collector making a continual trip among the passengers collecting the zone ticket, as a zone limit is reached. This difficulty is partially overcome by the fact that the capacity of all the cars in Glasgow is limited to six standees. Mr. Dalrymple said that with the American methods of fare collection the conductor did not come in contact with the passenger often enough.

Eighty-four per cent of the people in Glasgow, which means 84 per cent of the 417,000,000 passengers hauled a year, pay 3 cents or less per ride, and due to this low fare and the fact that the residence district is located very near the central manufacturing or business district, the noon peak load is as heavy as the morning or evening peak. This can be easily accounted for when it is realized that the Glasgow Tramways serve 30 square miles as compared with 200 square miles of the Chicago Surface Lines. Three thousand seven hundred trainmen are employed to serve the double-deck cars. Their wages average $16 per week. The average wage of the 5,600 trainmen in the transportation department of the surface lines is $34 a week.

New Fare Plan in East Liverpool Will Effect Time Saving

A new system of fare collection will shortly become effective on the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, between Wellsville and Midland. If the plan proves satisfactory, it will be introduced on other local lines as well as the Steubenville-Beaver Interurban system.

Under the new scheme, as devised by Superintendent of Transportation M. T Montgomery, passengers, instead of depositing money in the fare box, upon entering the car, or paying upon leaving the car, will purchase tickets from the motorman. By indicating their destination, they will receive a ticket on which is stamped the amount of fare which they have paid. This ticket is held by the passenger until he leaves the car, and then will be deposited in the fare box. The motorman will know whether the passenger is leaving the car in the zone to which his fare has been paid by the color of the ticket. Ten sets of tickets will be used on the main line and will be arranged in front of the conductor, so they can be readily detached as the passenger enters the car. The register will return the correct change to the passenger, which will save time which is usually required in sorting the change from the fare box. Special provision is made for student tickets, which will be good for forty-six trips per month and will be sold from and to all points on its lines at the rate of 1½ cents per mile or fractional part thereof.

While a receipt system has been in effect on the interurban system, the plan, as worked out by Superintendent Montgomery, is practically new on the city lines. The system is patented and will be put into effect just as soon as the tickets can be printed and holders provided.

Omaha Fares Unchanged

Commission Decides Seven-Cent Fare Shall Continue for an Indefinite Period

Citizens of Omaha who make use of street cars need expect neither a reduction nor an increase in carfare, according to a report issued by the State Railway Commission. Although the commission finds that the Omaha & Council Bluffs Street Railway has failed to earn 7 per cent on a valuation of $13,800,000 set by the commission, it has approved the present schedule of rates for an indefinite future period, "the company indicating its willingness to continue the effort to make present rates meet the necessities."

OPPOSES ACCOUNTING METHODS

The statement of the railway commission was in part as follows:

> The company made claim to a value of its physical property and working capital in amount of $23,301,177, using price levels of 1919 in arriving at the result. It set forth a value of $19,915,254 for its physical property, using average prices of 1916 to 1919. It claimed a value, after allowing depreciation, of $21,466,772 for its physical properties and laid claim to additional intangible value of $1,825,000, making total valuation of $23,291,772, on which it was alleged it was entitled to a fair return.
>
> The commission's engineering department found that the fair cost of the properties to the company, plus necessary working capital, had been $11,317,618, and that the fair experienced cost of the company, depreciated to meet the present condition of the plant, was $8,600,000. The commission's engineer testified that his figure did not represent fair value because he had not added to it anything for increased price level or for intangible elements recognized by the courts. He left those facts for the commission to consider.

The opinion also criticises the method by which the company has kept track of the changes in its property in the last twenty years. The company is notified that it will soon be called upon to amend its accounting practices in certain unnamed respects.

The commission also finds that at the time of the reorganization of the Omaha & Council Bluffs Street Railway in 1889 securities were issued which did not represent property brought into the consolidation or payments of cash for the securities. The commission holds there is no warrant for the assumptions of the company that the property was worth the sum of the bonds and preferred stock at the beginning of 1903.

R. A. Leussler, vice-president and general manager of the railway, said:

> I am very much disappointed in the decision. The company clearly showed the value of its property to be much more than the figure found. The commission found the company entitled in the last three years to approximately $1,000,000 in return more than it earned. The company attempted, from its books, to show that the experienced cost of constructing the plant had been not far from $21,000,000. Elaborate exhibits were presented to prove the point. The commission rejected the evidence as entirely unfounded.

The final step in the evolution of the financial history of the railway came in 1902, when there was a further reorganization and the injection of eastern capital. All the properties west of the river were owned by the Omaha Street Railway and came into the new reorganization which brought in also a long time lease of the properties in Council Bluffs, Iowa, and the toll bridge across the Missouri River, which was owned by the Council Bluffs corporation. Concerning this financing the commission says:

> The Omaha Street Railway came out of the period of reorganization and with bonds somewhere between $1,500,000 and $2,250,000. Most of its property was at the retirement stage due to obsolescence, this property including inadequate horse cars, horse car roadway too light for electric lines, a large number of horses necessarily disposed of when the lines were electrified, and the power plant and cable of the Cable Tramway.
>
> By canceling out the bonds common to the old and new companies we find that the process of reorganization had transformed $5,000,000 of common stock, $4,000,000 of preferred stock, and $4,850,000 of refunding bonds. The properties had gained $1,470,000 in cash and the lease of the Council Bluffs properties. Nothing in the record indicates the price at which the bonds were marketed. If they sold as low as 80 and the Council Bluffs lease were brought in at a value of $1,000,000 to those who had it to offer the common stock in the predecessor company was ultimately represented in the new company by an equal amount of common stock, $60 of preferred stock and $60 in bonds. Efforts to secure an accurate statement of the terms of consolidation failed and the records of the present company's office do not seem to contain the data.

The proceedings, which this finding of the commission is presumed to conclude, began in 1918, with an application on the part of the railway for an increase in fares as an emergency. The commission denied the application on the ground that no emergency existed. An appeal was taken to the Supreme Court of Nebraska, and in July, 1919, the court reversed the commission and ordered it to grant emergency rates to last until the commission had ascertained the value of the company's properties and had made a rate based upon that value and the necessary operating expenses. The commission soon issued orders to increase the fare to 7 cents. The valuation of the properties, the taking of testimony, and the reaching conclusions have covered a period of almost three years.

Corporation Counsel W. C. Lambert, who represented the city, was quoted as follows:

> While no reduction in fare has been obtained, a figure has been set by the order, much less than the company claimed as the value of the property which will be of great advantage in all controversies over rates in the future.

The order specifies that as conditions change, the board may make changes on its own motion or through application of interested parties.

Conducts Traffic Survey

In order to improve its service and to be able to take better care of the car needs of a rapidly growing city, the Georgia Railway & Power Company, Atlanta, is conducting an unusual survey of traffic conditions in Atlanta. Uniformed attendants of the company are riding on the street cars and interurban cars with the passengers, asking a series of questions of many hundreds of the company's patrons in order to obtain first-hand information as to what the Atlanta public desires in the way of street car service and improvements. The company plans later to take action in the more important matters thus learned from the public.

City Restrained

A Permanent Injunction Has Been Granted Preventing the City of Youngstown from Interfering with Buses

Judge Lyon at Youngstown, Ohio, has granted a permanent injunction to the jitney association preventing the city from interfering with loading or unloading in Central Square.

The jitneymen say that if a new ordinance is passed and upheld in the Common Pleas Court they will carry the case to the Supreme Court.

In his decision, Judge Lyon pointed out that section three of the ordinance gave the director power to make regulations under authority given him by section two. This, Judge Lyon said, was evidently a mistake, as section two only defines the boundaries of the congested district. The court is of the opinion that the reference should have been made to section one, which authorizes the director of safety to regulate traffic in the congested area. Without authority to enforce regulations by the director, the ordinance is worthless, the court held.

COURT REBUKES COUNCIL

Judge Lyon took occasion to score City Council for its action in attempting to give such wide authority to an administrative officer. He said that all decisions from the Supreme Court have been against such practice. He called attention to the fact that the director of safety was authorized to make regulations that should properly have been a part of Council's duty.

In passing on the case, Judge Lyon said if it had not been for the mistake in drawing the ordinance, he would have had to uphold it, much as he would have disliked to do so, as Toledo passed a similar ordinance some time ago and it was upheld by the courts, and this decision would have been binding on the court in the present case.

The suit was brought by John Hogan in behalf of the jitney operators following the issuing of an order by Safety Director Hamilton, barring jitneys from the congested district. This order was issued on authority of an ordinance passed by Council in July.

The order applied to buses of the Pennsylvania-Ohio Electric Company as well as jitneys and the traction company had worked out a plan for loading buses just outside the congested district boundaries. This plan, however, did not have to be put into effect when the temporary injunction was granted.

The attack on the order by Hamilton was based on the ground that Council had no right to pass an ordinance depriving jitney owners of the right to use the streets. The arrest of Hogan for loading his jitney in Central Square, which brought about the test case, was also attacked on the ground that it was based on the wrong law.

The city, on the other hand, defended its position on the ground that a previous ordinance had barred jitneys from Central Square and they had been allowed to go back only by tacit agreement to ignore the law; hence the new order was not taking away any rights that the jitney owners legally possessed, the city contended.

While the case was before the court, the new state law, placing jitneys under regulation by the Public Utilities Commission, went into effect. Jitney association officials say this takes away from the city all power to regulate the buses and another lawsuit to test this point is expected.

Denies Fare Increase.—The Illinois Commerce Commission dismissed a petition of the Chicago Elevated Railway asking for a reduction in fares to Evanston, Wilmette, Oak Park and other suburbs. Commuters, temporarily at least, will pay the prevailing rates.

Extends One-Man Car Service.—The Worcester Consolidated Street Railway is making extensive additions of one-man cars to its lines, both city and suburban. Seven have been put into service on city lines which have never had that type of car before. One-man car service had also been started between Worcester and Leominster, a line of 20 miles.

Approves New Rates.—The Public Service Commission has approved a tariff providing numerous changes in local passenger rates applying between all stations on the New York state lines of the Olean, Bradford & Salamanca Railway, effective Oct. 8. In general, increases are made in interurban fares (fare basis increased from 4 cents to 4.5 cents per mile), commutation fares, baggage charges and special car rates. Present mileage book rates are canceled. Provision is made for the sale of monthly school tickets (forty-six single trips) at one-half the regular one-way fare.

Decision Postponed.—The New York Transit Commission recently announced that it had postponed its decision until October, 1924, although it was favorably inclined to change the Thirty-third Street station on the east side subway of the Interborough Rapid Transit from a local to an express stop. The commission says that it has in view the existing financial condition both of the city and of the Interborough Rapid Transit Company. It is estimated that the cost of the work would be from $1,250,000 to $1,500,000, which would be exclusive of the cost of acquisition of any real estate or easements that might be required.

Express Service Planned.—Negotiations have been completed whereby competitive railway express service will be re-established in Indianapolis and in points south of Indianapolis to Louisville. This announcement was made by Bert Weedon, traffic manager of the Interstate Public Service Company, operating a traction line between Indianapolis and Louisville. Mr. Weedon, for the interurban company, and J. E. Skaggs of Atlanta, Ga., representing the Southeastern Express Company, signed a contract for the service on the interstate line. The company soon will establish in Indianapolis a motor pickup and delivery service and will operate station service at other points south of Indianapolis. Through express trains are to be scheduled, serving both Indianapolis and Louisville, these trains making connections with trains for points south over the Southern railway system.

No Accident Record Rewarded. — Accidents on the line of the Groton & Stonington Traction Company and the Shore Line Electric Railway have practically all been minor ones during the past six months. This fact was brought out by Superintendent O'Brien, who gave a brief discourse on accident prevention at a recent meeting of employees and officials of the properties in Mystic, Conn. Gold pieces were awarded to the trolley employees who had no accidents or who had been exonerated from accidents, as well as having a clean record for courtesy and punctuality. D. C. Peck, manager and R. W. Perkins, president and receiver, spoke on accident prevention and complimented the men in minimizing the number of mishaps on the road. James Hammond of the New London Chamber of Commerce gave an interesting talk on the trolley situation from the point of view of an outsider.

Legal Notes

CALIFORNIA—*Care Required in Crossing Tracks of Electric Railway.*

As much care is required of a person crossing the tracks of an electric railway upon a private right-of-way in the open country as is required of a person crossing the tracks of a steam railway. [New York Lubricating Oil Company vs. United Railroads of San Francisco, 215 Pacific Rep. 72.]

FEDERAL COURTS—*Payment for Transportation by Railway Operated by the State Held Not for Services Rendered to State.*

Payments by a railway company which was being operated by agents of the state, but not owned by the state, for coal transported by the company, which came from the operating revenues of the corporation and not from the state funds, though they might later appear in a deficit which the state agreed to make good, are not payments by the state within the exception from the 3 per cent internal revenue tax on payments for transportation by water consigned from one point in the United States to another. [Case of Boston Elevated Railway, 288 Federal Rep. 864.]

FEDERAL COURTS — *Confiscatory Rate Valid if by Contract — Order of Commission on Seating Capacity.*

When a contract between a municipality and an electric railway company fixing rates is valid, the Supreme Court is not concerned with the question whether the stipulated rates are confiscatory.

Where a contract between a town and an electric railroad company prescribed the rate of fare chargeable between such town and a city, a statute construed as making such rates applicable in territory thereafter annexed to the town impaired the obligation of the contract by adding to its burdens.

An order of a state railroad commission, directing an electric railroad company to provide additional seating capacity on some lines and trailers on a line on which rates were fixed by contract with a municipality, was not beyond its power to require adequate service, where there was nothing in the contract in conflict therewith. [Georgia Railway & Power Company et al. vs. Town of Decatur, 43 Supreme Court Rep. 613.]

FEDERAL COURTS — *Annexed Territory —Order to Issue Transfers—Contract Fixing Fare Applies in Either Direction.*

Where contract between a municipality and an electric railway company fixed the fare chargeable between the municipality and another city, the application of such fare to territory afterwards annexed to the municipality impaired the obligation of the contract.

Where a contract between a city and an electric railway company, fixing the fare chargeable between such city and another city, contained no provision on the subject of transfers, an order of the railroad commission requiring the issuance of free transfers was erroneous.

A contract between the city of C. and an electric railway company limiting the fare chargeable from C. to A. to 5 cents, required passengers to be carried in either direction between C. and A. at the stipulated rate, especially where this construction agreed with the practice followed for many years. [Georgia Railway & Power Company et al. vs. Mayor and Council of City of College Park, 43 Supreme Court Rep. 617.]

MICHIGAN — *Duty of Motorman to Know that Passengers Are Safely on Board Before Starting Car.*

Where a car had stopped, not to permit boarding or alighting of passengers, but to permit the conductor to replace the trolley, and plaintiff in accordance with custom attempted to board the car at that place, and did succeed in gaining entrance to the steps, from which he fell, held, that it was the duty of conductor, before signaling to proceed, to ascertain that all passengers were safely on board; "on board" meaning within the closed doors. A passenger standing on the steps cannot be said to have voluntarily remained there, so as assume the risk of injury from maintaining that position, if he could not have reached a position on the platform or in the car, without pushing or shoving through passengers who had crowded the only other available standing places. [Morris vs. Detroit United Railway, 193 Northwest Rep. 871.]

MINNESOTA—*Purchaser of Electric Line Subject to Contract Prohibition Against Use of Steam Power.*

Where a municipal corporation and an electric traction company have agreed upon the terms by which streets may be crossed by an electric railway, and the use of steam as a motive power is prohibited by such contract, a purchaser of the electric traction company's line takes it subject to such prohibition. But such a contract does not limit the power of the purchasing company, if it has such power, to acquire by condemnation the right to use the street crossings for a steam railway. [St. Louis Park vs. Minneapolis, Northfield & Southern Railway, 194 Northwest Rep. 327.]

MINNESOTA—*"Right" Defined as Used in Statute Regulating Traffic.*

The word "right" in Gen. St. Supp. 1917, sec. 2552, subd. 2, providing that at street intersections the driver of a vehicle shall give the right of way to any vehicle approaching from his "right," means the right of the vehicle in the direction in which it is approaching the intersection, and not the right hand of the driver if he is backing. [St. Clair vs. Duluth Street Railway, Northwest Rep. 690.]

OKLAHOMA — *Company Liable for Injuries to Livestock by Failure to Fence.*

Failure of a railway company to maintain a right-of-way fence, as required by sections 1435-1438, inclusive, Rev. Laws Okl. 1910, constitutes negligence, and such company is liable for injuries to livestock resulting therefrom. [Muskogee Electric Traction Co. vs. Minugh, 215 Pacific Rep. 747.]

TEXAS—*Instruction in Personal Injury Case Precluding a Verdict for Defendant, Though Plaintiff's Negligence Was Sole Proximate Cause, Held Erroneous.*

In an action for personal injuries sustained by plaintiff while riding in an automobile when struck by defendant's street car, the giving of an instruction that the jury could not find for defendant even though negligence of the automobile driver was the sole proximate cause of the injury, if they found that defendant was "guilty of negligence in any respect" held reversible error. Such a charge precluded the company from having its defense as to the proximate cause of the injury presented clearly and untrammeled by other matters to the jury, as it had a right to have done. [Texas Electric Railways vs. Sikes et al., 251 Southwest Rep. 589.]

Personal Items

J. H. Aitken Leaves Schenectady Railway

J. H. Aitken, secretary, treasurer and purchasing agent of the Schenectady Railway, will resign on Nov. 1 after twenty-one years' service.

Mr. Aitken became purchasing agent of the Schenectady Railway in 1902, when the General Electric Company took over the ownership and management of the lines. In 1905, when the General Electric Company sold the road to the New York Central and Delaware & Hudson companies, the present owners, Mr. Aitken succeeded James O. Carr as secretary and treasurer. He retained his purchasing agent duties and since 1905 has served the company in all three capacities.

It is said that Mr. Aitken wished to resign months ago, but that the company officers prevailed upon him to remain for the time being. Conforming to this desire Mr. Aitken withheld his resignation until the Sept. 26 meeting of the board of directors in New York, when it was received and accepted. Mr. Aitken said he would rest and travel for some months before entering upon some new business undertakings.

No announcement has been made of Mr. Aitken's successor.

Hamilton Baluss Retires from Railway Field

Hamilton Baluss, general manager of the Susquehanna Traction Company, Lock Haven, Pa., resigned that position on Oct. 1 to take an extended vacation. Mr. Baluss has been a prominent figure in the railway field since 1898, when he entered the employ of the Detroit, Ypsilanti & Ann Arbor Electric Railway. He left that company to go with the Van Dorn & Dutton Electric Company, Cleveland. Later he became identified with the Grand Rapids, Holland & Chicago Electric Railway, and following that he was employed by the Chicago & Joliet Electric Railway. He resigned his position with the last-named property to become general manager of the Marquette, City & Presque Isle Electric Railway of Marquette, Mich.

Following this appointment, Mr. Baluss went to the property he is now with, as general manager. He later became general superintendent of the Cincinnati, Georgetown & Portsmouth Railroad of Cincinnati and left there to become general manager of the Westchester, Kennett & Wilmington Electric Railway of Kennett Square, with which he was connected for nearly twelve years. When the war broke out Mr. Baluss wanted to get "in" and accordingly became chief army inspector of the Philadelphia district of the United States Ordnance Department. He retained this position until Jan. 15 following the armistice, but when things became normal again Mr. Baluss thought that his best work was done in the railway field, so he went back to his old work as general manager of the Susquehanna Traction Company. He has kept that position up to the present time. Mr. Baluss was graduated from the Detroit High School and took up the study of law.

New Youngstown Manager

C. S. MacCalla, Recently Appointed, Has Entered Fully Upon His Duties

C. S. MacCalla has entered actively upon his duties as vice-president and general manager of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway and other subsidiaries of the Pennsylvania-Ohio System operating city railway lines in and interurban lines between Youngstown and Warren, Ohio, and Sharon and New Castle, Pa.

C. S. MacCalla

Mr. MacCalla brings to his new field of activity a wide and varied experience in public utility operation, both in the railway and in the light and power divisions of the electrical industry. He was born in Wallingford, Pa., in 1876. Immediately upon leaving Lehigh University, where he was graduated in 1896, Mr. MacCalla began his work with public utilities, spending brief periods in the installation department of the Philadelphia Bell Telephone Company and as a "trouble shooter" for the Edison Electric Light Company, Philadelphia, now the Philadelphia Electric Company. Then followed four years with the Edison Electric Illuminating Company of Brooklyn (Brooklyn Edison Company) successively as draftsman, construction boss and general construction foreman.

As indicated in the ELECTRIC RAILWAY JOURNAL for Sept. 8 at the time of the announcement of Mr. MacCalla's appointment to the properties at Youngstown, his active electric railway experience began in 1901 when Mr. MacCalla joined the foreign department of the General Electric Company as principal assistant engineer in charge of the installation and initial operation of the Sydney, Australia, tramways system for the New South Wales government, the work including the installation of the steam-electric generating plant, substations and railway equipment, the system being the then largest three-phase plant south of the equator.

In 1903 Mr. MacCalla went to the Pacific Coast, where he was identified with the Washington Water Power Company, Spokane, Wash., for fifteen years, successively as assistant to the general manager, assistant general manager, general manager and vice-president and general manager, continuing in the last named position for five years, and having full charge of operations, both power and railway, in Spokane and some thirty-odd smaller cities and towns within a radius of 100 miles. He equipped the Spokane city railways with one-man Birney safety cars, the installation being the first in any city of more than 100,000 population. Returning to the east, Mr. MacCalla was elected vice-president and general manager of the Virginian Power Company, Charleston, W. Va.

General Tripp Going to Japan

General Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, and Loyall A. Osborne, president of the Westinghouse International Company, left New York for Japan on Oct. 4. They will sail from San Francisco on Oct. 10 and expect to visit Shanghai, Hongkong, Peking and the Philippines before returning home.

C. L. Harris has succeeded M. B. Gouty as chief engineer of the power station of the Indiana Service Corporation.

H. L. Hawkins, engineer of maintenance of way of the Seattle & Rainier Valley Railway, is in addition fulfilling the duties of master mechanic.

Paul R. Goldey has succeeded M. T. Montgomery as superintendent, claim agent and purchasing agent of the Atlantic & Suburban Railway, Pleasantville, N. J.

John T. Harrington, who has been vice-president and general counsel of the Pennsylvania-Ohio Power & Light Company, Youngstown, Ohio, has been elected president of that company. Mr. Harrington will continue as general counsel of the company.

Carl E. Keefer, machinist in the Altoona and Tyrone electric plants of the Altoona & Logan Valley Electric Railway, was appointed master mechanic effective on Aug. 15, succeeding Robert Long. Mr. Long resigned to take a position as test engineer of the Texas Oil Company, with headquarters in Columbus, Ohio.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Orders Continue at High Level

A compilation of orders for new passenger cars placed during the first six months of 1923 was shown in several tables in the issue of Sept. 29. The number of cars ordered during this half-year period is slightly greater than one-half the total number of passenger cars ordered during the entire year of 1922. This augurs well for the car building industry and also shows that the high buying levels of 1916 and 1920 are being reached or exceeded.

The outstanding fact shown by these tables is the large number of one-man two-man double-truck cars which are being ordered. There were a total of 1,011 of these reported for city service and thirty-six for interurban service. Buying of single-truck one-man cars of the 28-ft. body type still continues, particularly on small electric railway properties, but the total number of these ordered is very much less than for preceding years. There were a total of 147 of this type ordered during the first six months of 1923 as compared with a total of 762 for the entire year of 1922.

The largest individual orders placed were for 520 one-man two-man cars for the Philadelphia Rapid Transit Company, and 200 of a similar type for the Brooklyn City Railroad. Both of these companies ordered cars with front entrance and center exit doors arranged for pay-as-you-pass fare collection. Of the cars ordered by the Philadelphia Rapid Transit Company, 135 are of the double-end type with end doors only.

In the tabulation of passenger cars ordered by individual companies the railways in each state were alphabetically arranged and the various states were grouped into four districts, in a manner similar to that followed in the Annual Statistical Number of the JOURNAL for previous years. As was to be expected the district north of the Ohio River and east of the Mississippi River purchased the greatest number of cars.

Predicts Good Electrical Future Abroad

In the opinion of A. W. Burchard, vice-chairman of the General Electric Company and president of the International General Electric Company, the future of the electrical industry in Europe is promising. Mr. Burchard has just returned from a two-months' trip after visiting foreign affiliated companies in England, Spain, France, Belgium and Holland.

After looking things over abroad, Mr. Burchard estimates the business of the International General Electric Company will amount to about $21,000,000 this year. Bookings of the General Electric Company since the first of July amount to between $5,000,000 and $6,000,000 weekly, with cash on hand about the same as it was at the first of the year—about $86,000,000.

Comparing the situation today with what it was a year ago, Mr. Burchard says that the business in the company's factories abroad is better, particularly in France and Italy. He said the Italian factories were running at capacity and that in England the British Thomson-Houston Company, the affiliated foreign company, was employing more men on its payrolls than ever before and was running at capacity. He said that the electrical industry in England, regarding unemployment, was in very good shape and that there was nothing like as much unemployment as there was in other lines such as the textile industry.

The Compagnie Française Thomson-Houston, the affiliated French company, had secured a contract for the electrification of the Paris-Orleans Railroad, amounting to about 100,000,000 francs, and Mr. Burchard said that about 25 per cent of this order will be manufactured in America by the General Electric Company.

Another Brazilian Electrification

A contract for the electrification of the Campos do Jordao Railway, in Brazil, has been awarded to the English Electric Company by the government of São Paulo, according to the London *Engineer*. This contract covers the electrification of an existing meter-gage railway and includes the supply and erection of about 30 miles of overhead catenary construction, on the 1,500-volt d.c. system, and from 15 miles of 30,000-volt 3-phase transmission line. The contract also includes the building and equipment of a substation, as well as motor coaches for passenger and goods service. The 30,000-volt, 50-cycle supply current will be transformed down to 2,000 volts at the substation, where a 500-kw. synchronous motor-generator set will convert it into direct current at 1,500 volts.

The coaches are to seat forty passengers each and the goods wagons are to be of the covered type and are to carry 10 tons. Electrical equipment of each type of motor coach will comprise four self-ventilated traction motors, each wound for 750 volts. The motors are connected two in series and the two pairs in series parallel.

The electrification of this line is of particular interest by reason of the fact that one-third of the total route length is level, the remainder, consisting of some 8 miles of track, having gradients which vary from 6 per cent to 10.5 per cent. In view of this, the motor coaches are to be equipped with four different braking systems, viz.: hand, air, rheostatic and electromagnetic track brakes, of which the last named is intended for use in emergencies only.

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 2, 1923

Metals—New York

Copper, electrolytic, cents per lb.	13.25
Lead, cents per lb.	6.875
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.65
Tin Straits, cents per lb.	41.875
Aluminum, 98 to 99 per cent, cents per lb.	25.20
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.825
Somerset mine run, Boston	2.375
Pittsburgh mine run, Pittsburgh	2.05
Franklin, Ill., screenings, Chicago	1.30
Central, Ill., screenings, Chicago	0.95
Kansas screenings, Kansas City	2.625

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.15
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.50

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	3.35

Waste—New York

Waste, wool, cents per lb.	12–16
Waste, cotton (100 lb. bale), cents per lb.:	
White	11–13.50
Colored	8–13

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.97
White lead (100 lb. keg), cents per lb.	11.375
Turpentine (bbl. lots), per gal.	$0.98
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.00
Rubber-covered wire, No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 4x8x4, f.o.b.	
Chicago, dressed, per sq.yd.	$3.50
Common, per sq.yd.	3.10
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York

Heavy copper, cents per lb.	10 75
Light copper, cents per lb.	9.75
Heavy brass, cents per lb.	5.75
Zinc, old scrap, cents per lb.	4.25
Yellow brass, cents per lb. (heavy)	6.00
Lead, heavy, cents per lb.	5.75
Steel car axles, Chicago, net ton	$17.75
Old car wheels, Chicago, gross ton	19.25
Rails (short), Chicago, gross ton	19.25
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	8.25

Rolling Stock

Kansas City Railways wants to remodel eighty-five of the "600" type of cars so that they can be used as one-man or two-man cars. The cost of remodeling these is estimated at $38,165.

Saginaw Transit Company has placed orders for fifteen Reo and ten White motor buses. The cost of this equipment is $122,000 and first deliveries will be received by Nov. 1.

Illinois Traction, Inc., Illinois Valley Division, formerly the Chicago, Ottawa & Peoria Railway, is considering the inauguration of service with lightweight one-man cars in place of its present heavy two-man cars.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has been given permission to destroy two single-truck cars and charge the sum of $6,200 to the company's depreciation fund. The two cars destroyed were a line and an emergency car, which had been replaced by double-truck cars for the same service. The new cars cost $7,500 each.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., has purchased nine cars which have been used on the lines of the Milwaukee Electric Railway & Light Company but have been rebuilt. The purchase includes six forty-six-passenger interurban cars weighing 24 tons each equipped with four 70-hp. motors. The other three cars are of the city one-man, p.a.y.e. type.

Cumberland County Power & Light Company, Portland, Me., received delivery last month of six cars, the order for which was placed in April of this year. The specifications of these cars follow:

Builder of car body	Wason
Type of car	D. T. one-man or two men
Seating capacity	Forty-six
Total weight	31,000 lb.
Length over all	40 ft. 3 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 2⅞ in.
Height, rail to trolley base	10 ft. 1⅜ in.
Body	Steel
Interior trim	Mahogany
Headlining	None
Roof	Arch
Air brakes	G.E.
Axles	Brill
Bumpers	Brill
Car signal system	Consolidated
Center and side bearings	Brill
Control	K-35 J.J. G.E.
Couplers	Brill
Curtain fixtures	Brill
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Gears and pinions	General Electric
Hand brakes	Brill
Heater equipment	Consolidated
Headlights	Golden Glow
Journal boxes	Brill
Lightning arresters	General Electric
Motors, type and number	G.E. 24 7B-4
Motors	Inside hung
Enamel	Sherman Williams
Registers	International
Sanders	O.B.
Sash fixtures	Mahogany
Seats	Brill Waylo
Seating material	Wood
Springs	Brill
Step treads	Brill
Trolley catchers or retrievers	Keystone
Trolley base	V.S. 13
Trucks	Brill 77 E 1
Ventilators	Brill
Wheels	Steel—26 in.
Special devices	Full safety equipment and selective valve

Bryan-College Traction Company, Bryan, Tex., has purchased three large motor buses.

Lackawanna & Wyoming Valley Railroad, Scranton, Pa., has purchased four new passenger cars for service between Wilkes-Barre and Scranton. The total cost is $115,000 and the cars are to go into service on or before April 1, 1924.

Indiana Service Corporation, Fort Wayne, has placed orders with the Differential Steel Car Company of Findlay, Ohio, for six Differential door-chute trail cars of 60,000 lb. capacity, of the following specifications:

Tilting body made of ¼-in. steel plate, reinforced; body divided into three compartments, each of which is to be 8 ft. 1 in. long at the floor; two center partitions to extend to top of sideboards, with end sheets rounded and with center section 14 in. above the sideboards; each compartment equipped with two doors, one at each side, hinged at top to permit of dropping; body 19½ in. from floor to top of sideboards, 7 ft. 6 in. wide and 27 ft. 1 in. long; equipped with electric dumping motor of 5 hp. capacity; M.C.B. trucks, 50 ton, and M.C.B. radial couplers; 33 in. wheels; car is 40 ft. 6 in. over end sills, 8 ft. 2 in. maximum width and about 6 ft. 6 in. from rail to top of sideboards when on 33 in. wheels; equipped with air and hand brakes. Tilting body is so arranged that it can be moved from central position about 24 in. to either side and revolved through an angle of 45 deg. and automatically stopped when it reaches this discharge angle; time required for this operation, including return of body to central position, is about one minute and is effected by one man moving a controller handle in the direction the car body is to be tilted; dumping controller fitted with automatic cut-off so that body will stop when it reaches the discharge angle of 45 deg.; controller lever located on platform of car.

The company has also ordered four Differential bottom dump ballast-spreading cars of 60,000 lb. capacity, equipped with M.C.B. trucks and M.C.B. couplers. Some specifications of these cars follow:

Both air and hand brakes; center dump doors may be operated by means of worm gear, or may be opened and closed by means of hand wheels on end platforms or at the sides of the car; doors divided into three parts, each one of which can be kept closed and the others opened for discharging material; doors built of steel plate and may be used to spread ballast as it is dumped.

Track and Line

Wisconsin Railway, Light & Power Company, La Crosse, Wis., has completed its double-track system on Main Street.

Kansas City Railways has made application to Judge Stone of the Federal court to spend $277,167 on improvements. Among the projects listed is the rebuilding of several lines.

Southern New York Power & Railway Corporation, Oneonta, N. Y., has made application to the Public Service Commission for permission to construct and operate over tracks in Chestnut Street between Main and Market Streets in Oneonta under a franchise granted by the city.

San Francisco, Cal. — Construction work on the Embarcadero subway under the Ferry Street car loop will begin within the next few months. The cost of the project, which is estimated at $425,000, will be divided among the Harbor Commission, the city and the two railway systems, viz., the Municipal Railways of San Francisco and the Market Street Railway.

Ohio Valley Electric Railway, Huntington, W. Va., will relay its line on a concrete base, and the city will repair depressions in the pavement. The relaying is caused by the removal of the Twentieth Street viaduct in Huntington to the center of the driveway. This was decided upon after an inspection made jointly by the company officials and city commissioners.

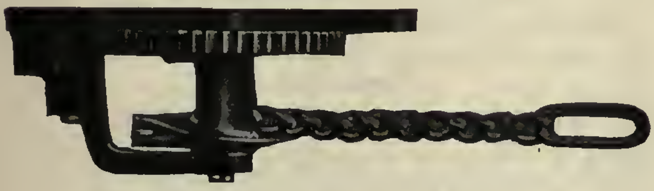
Trade Notes

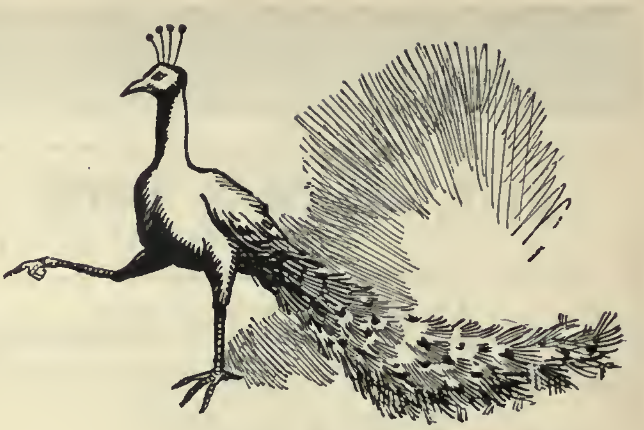
Westinghouse Traction Brake Company, Wilmerding, Pa., has announced the appointment of John B. Wright as assistant to the vice-president, with headquarters at the general offices in Wilmerding, Pa. In addition to this position Mr. Wright will also retain the title of assistant district manager, in charge of the company's commercial activities in the Pittsburgh district, a position which he has held since January, 1920. Mr. Wright has been a member of the Traction Brake organization since 1899.

Elliott Service Company, New York, has announced through James Elliott, president, the development of a service which will make it possible for the electric railway in any city—either alone or in co-operation with other interests and under the auspices of a representative civic organization such as the chamber of commerce—to conduct a carefully organized year-round public safety campaign for less than the cost of one fatal accident. The service includes complete plans for organizing a community wide safety campaign and all of the materials which it is necessary to use in such a campaign. The plan is based on the experience of all of the cities that have conducted successful public safety campaigns within the last five years. The materials will enable any city to carry on a Safety Week to start the permanent campaign; safety instruction in the public schools; a continuous safety poster campaign; a free safety school for commercial drivers, and a permanent educational publicity campaign. C. W. Price, who directed the Public Safety Campaigns in New York City, Washington, Baltimore, Pittsburgh and Louisville, Ky., is now vice-president of the Elliott Service Company, in charge of the Public Safety Division. Where necessary, the campaign will be started under the personal supervision of Mr. Price, Dr. E. George Payne, and Louis Resnick, all of whom have had wide experience in work of this kind. The Elliott Service Company heretofore has confined its safety activities to the development of materials for use in industrial safety campaigns. The complete service of this company on public safety will be shown for the first time at Atlantic City during the convention of the American Electric Railway Association.

Quick on the trigger

Many an old frontiersman owed his life by being *quick on the trigger*. Incidentally he had a good gun, a powerful gun, and he kept it in good condition to safeguard his own life.





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may mean life or death, too!

We don't depend so much on guns, nowadays, but we trust our lives, or the lives of others, to various mechanical devices.

On the railway car of today, the hand brake is like the old frontiersman's gun,—an emergency equipment. When we need it, we need it badly. Only a brake which is fast, powerful, and of ample capacity, can protect the lives of passengers. A make-shift brake, or a light, inadequate one is as useless as a tin cap pistol would have been to the pioneer.

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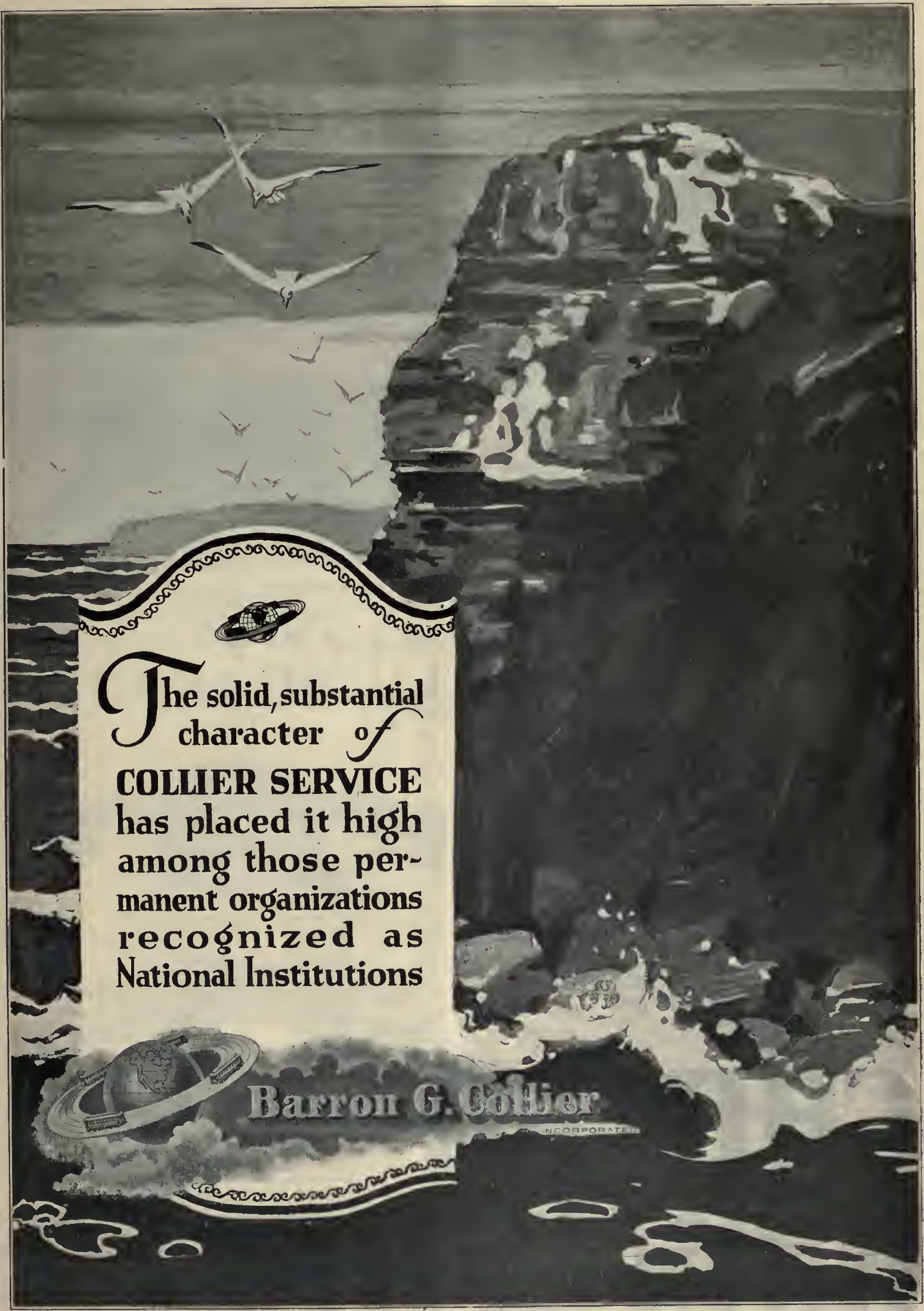
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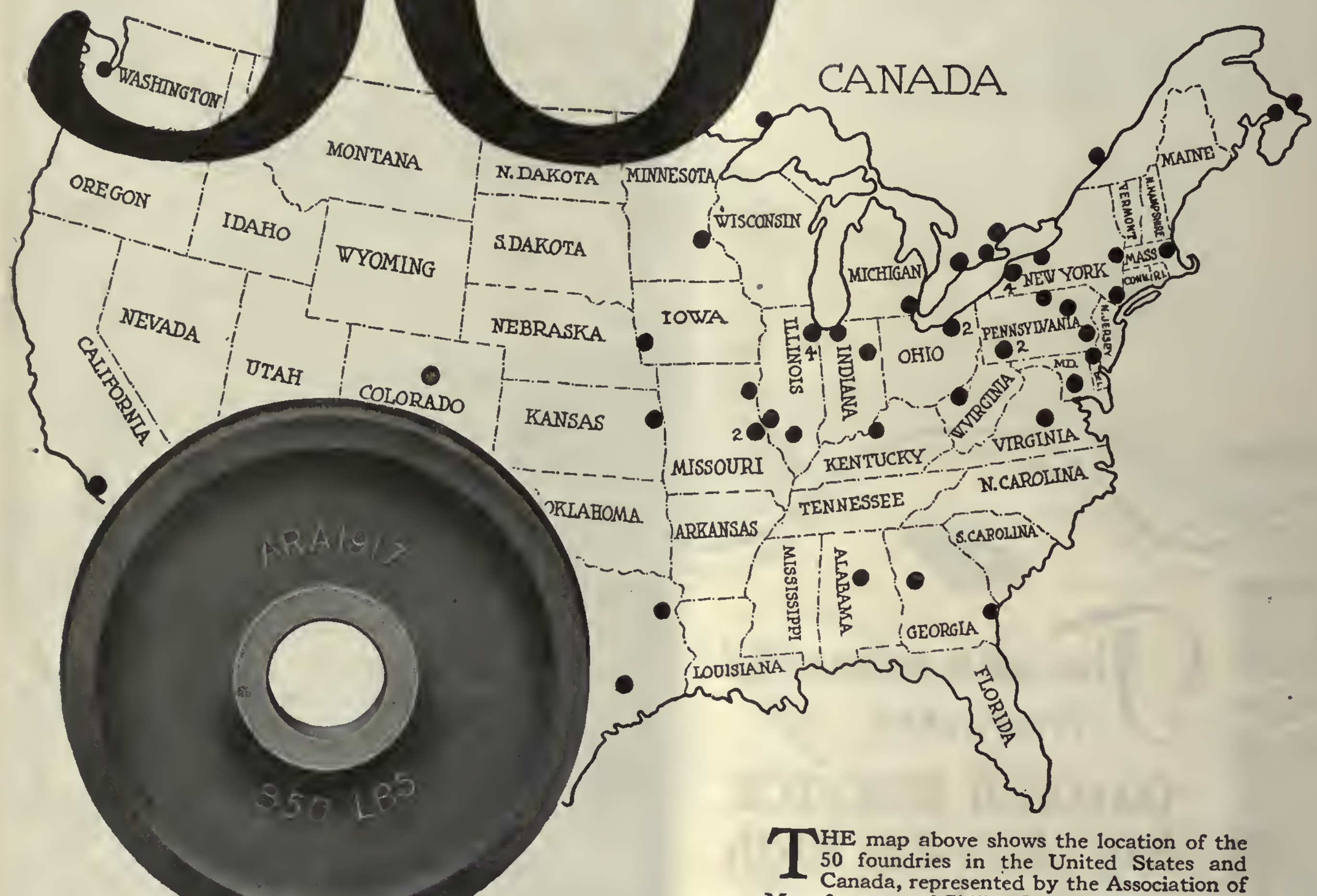

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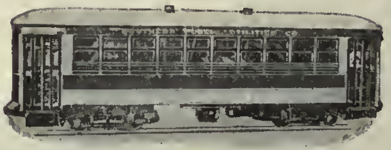

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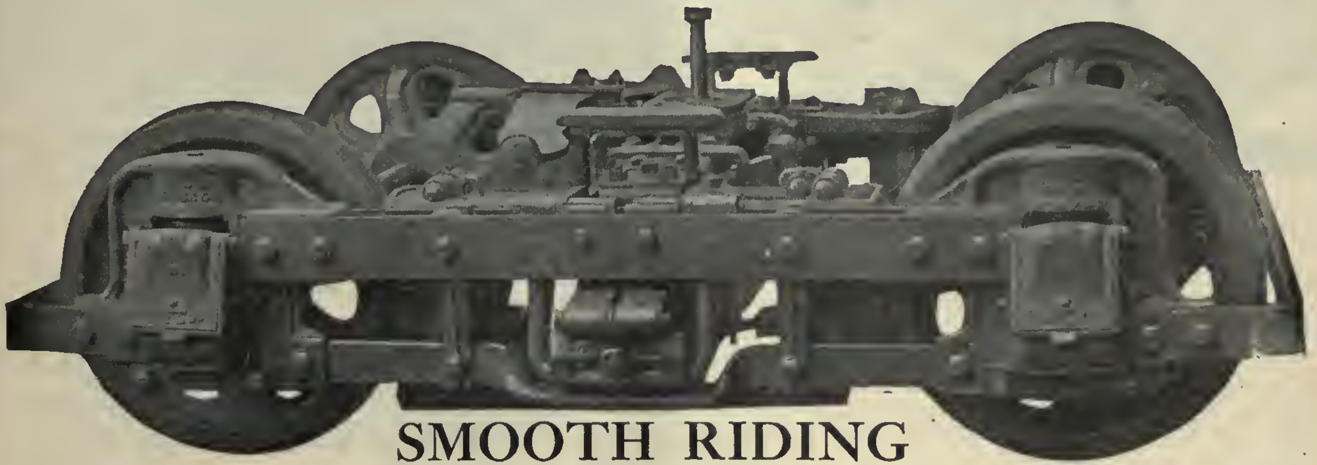

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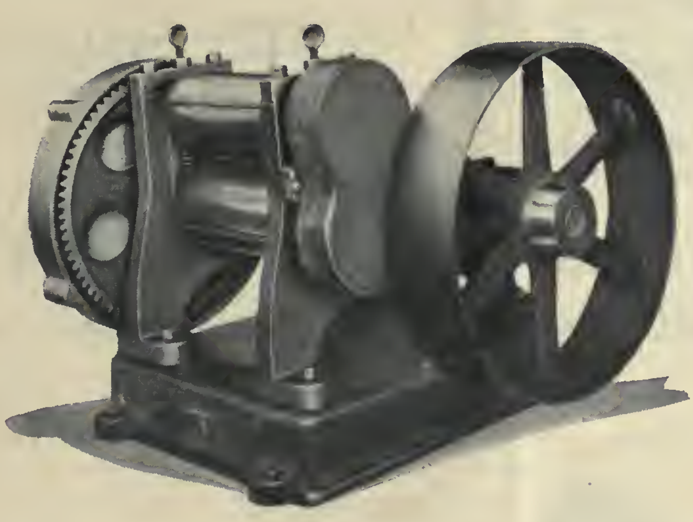

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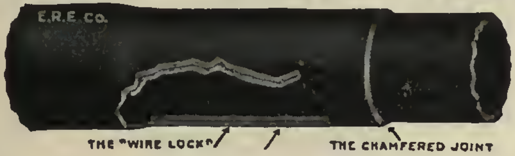

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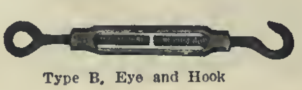

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Safeguard your Revenue

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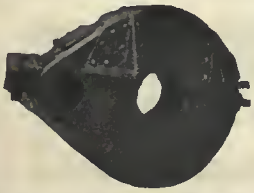

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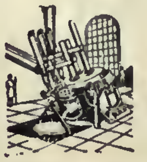

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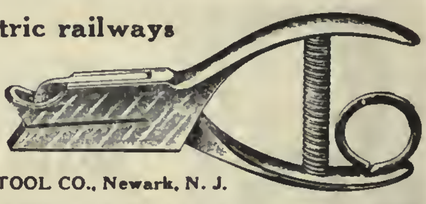

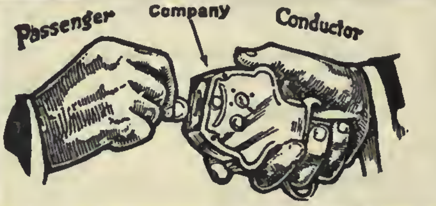

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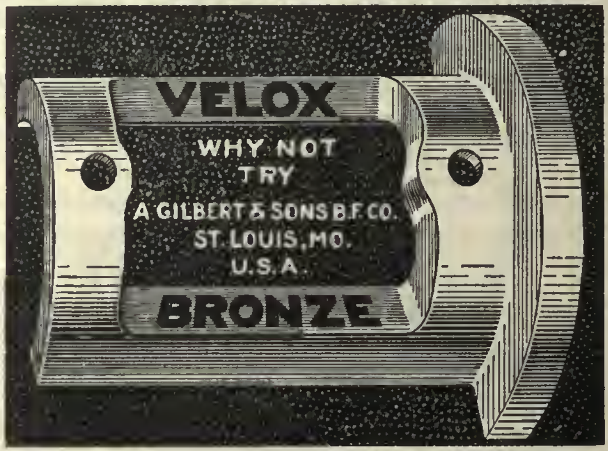

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Send your orders to us and deduct 20 per cent from the current quotations.

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This equipment is approximately two years old and may be inspected by calling at the Department of Street Railways, Detroit, Michigan.

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers, Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Columbia M. W. & M. I. Co.
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National Brake Co.
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Le Carbone Co.
Stackpole Carbon Co.
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(See Brushes, Carbon)

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Cars, Dump
Differential Steel Car Co., Inc.
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Cars, Passenger, Freight Express, etc.
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Electric Equipment Co.

Cars, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Castings, Funnel
Wharton, Jr. & Co., Inc., Wm.

Castings, Gray Iron and Steel
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Wharton, Jr., & Co., Inc., Wm.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Change Carriers
Cleveland Fare Box Co.
Galef, J. L.

Circuit Breakers
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. M. & J. M.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
WestinghouseElec . & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coils, Armature and Field
Columbia M. W. & M. I. Co.
General Electric Co.

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co.
Galef, J. L.
International Register Co. The

Coin Sorting Machines
Cleveland Fare Box Co.
Galef, J. L.

Coin Wrappers
Cleveland Fare Box Co.
Galef, J. L.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Compressors, Gas
Ingersoll-Rand Co.

Condensers
General Electric Co.
Ingersoll Rand Co.
Westinghouse Elec. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Mining Co.

Cord Adjusters
Nat'l Vulcanized Fibre Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.

Crossing Foundations
International Steel Tie Co.

Crossing Frogs and Switches
Ramapo Ajax Corp.
Wharton, Jr., & Co.,Inc.,Wm.

Crossings, Manganese
Indianapolis Switch & Frog Co.
Ramapo Ajax Corp.

Crossing Signals .See Signal Systems, Highway Crossing)

Crossings, Track, (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Edward Co., Inc., The O. M
Electric Service Supplies Co.
Morton Mfg. Co.

Dealers' Machinery
Electric Equipment Co.
Transit Equipment Co.

Derailing Switches, Tee Rail
Ramapo Ajax Corp.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging, (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.

Ears
Ohio Brass Co.

Electric Grinders
Railway Track-Work Co.

Electrodes, Carbon
Indianapolis Switch & Frog Co.
Railway Track-work Co.

Electrodes, Steel
Indianapolis Switch & Frog Co.
Railway Track-work Co.

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American Elec. Works
Roeblings Sons Co., J. A.

Enamels
Beckwith-Chandler Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Bibbens, J. Rowland
Buchanan & Laying
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A L.
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelly Cooke & Co.
Ong, Joe R.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Sangster & Co., A.
Shaw, Henry M.
Stevens & Wood, Inc.
Stone & Webster
Wortham, Edwin

Engineers, Inspecting & Chemists'
Pittsburgh Testing Lab.

Engines, Gas, Oil and Steam
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.

Expansion Joints, Track
Wharton, Jr., & Co., Inc., Wm.

Fare Boxes
Cleveland Fare Box Co.
Galef, J. L.
Nat'l Ry. Appliance Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Electric Service Sup. Co.
Star Brass Works

Fibre and Fibre Tubing
Nat'l Vulcanized Fibre Co.
Westinghouse Elec. & M. Co.

Field Coils (See Coils)

Flangeway Guards
Godwin Co., Inc., W. S.

Flaxlinum Insulation
Nat'l Ry. Appliance Co.

Floodlights
Electric Service Sup. Co.

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.

Frogs & Crossings, Tee Rail
Ramapo Ajax Corp.

Frogs, Track. (See Track Work)

Frogs, Trolley
Ohio Brass Co.

Furnaces, Electric
American Bridge Co.
Pittsburgh Electric Furnace Corp.

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.

Gear Cases
Chillingworth Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & M. Co.

Gears and Pinions
Ackley Brake & Sup. Corp.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
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General Electric Co.

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English Electric Co.
General Electric Co.
Westinghouse Elec. & M. Co.

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Lorain Steel Co., The

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Indianapolis Switch & Frog Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

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Railway Track-work Co.

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Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.

Guards, Cattle
American Bridge Co.

Guards, Trolley
Electric Service Sup. Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
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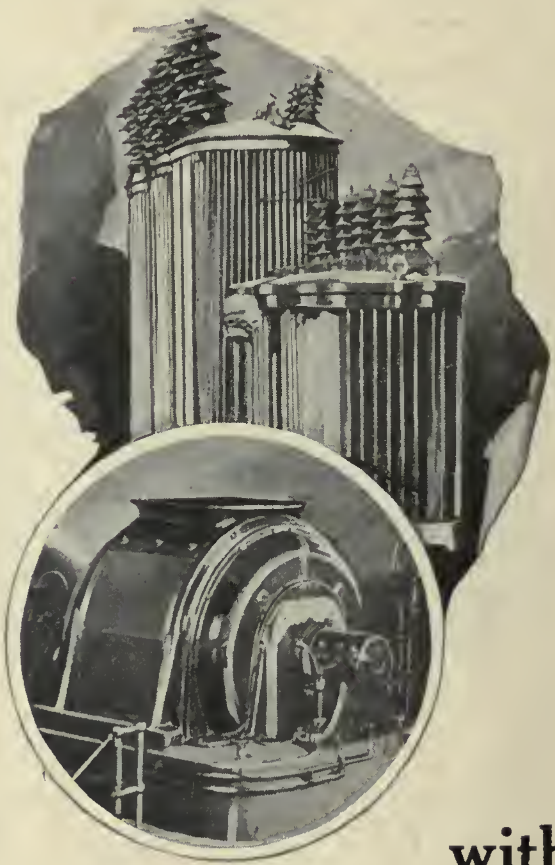

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Electric Ry. Equipment Co.
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

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Electric Service Sup. Co.
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Insulators, High Voltage
Lapp Insulator Co., Inc.

Insulation, Slot
Irvington Varnish & Ins. Co.

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General Electric Co.
Westinghouse E. & M. Co.

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Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

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Shaw, Henry M.

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Anderson M. Co., A. & J. M.
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General Electric Co.
Ohio Brass Co.
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Archbold-Brady Co.
Columbia M. W. & M. I. Co.
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Electric Service Sup. Co.
English Electric Co.
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Westinghouse Elec. & M. Co.

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Universal Lubricating Co.

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Galena Signal Oil Co.
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Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.

Manganese Steel, Special Track Work
Indianapolis Switch & Frog Co.
Wharton, Jr., & Co., Inc., Wm.

Manganese Steel Switches, Frogs and Crossings
Ramapo Ajax Corp.

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(See Buses, Motor)

Motormen's Seats
Brill Co., The J. G.
Electric Service Sup. Co.
St. Louis Car Co.
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Motors, Electric
General Electric Co.
Westinghouse Elec. & M. Co.

Motor and Generator Sets
General Electric Co.

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Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

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Oxygen
International Oxygen Co.

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Westinghouse Tr. Br. Co.

Paints and Varnishes, Preservative
Beckwith-Chandler Co.
Dixon Crucible Co., Joseph

Paints and Varnishes for Woodwork
Ackley Brake & Sup. Co.
Beckwith-Chandler Co.
National Ry. Appliance Co.

Pavement Breakers
Ingersoll-Rand Co.

Paving Guards, Steel
Godwin Co., Inc., W. S.

Paving Material
Amer. Br. Shoe & Fdry. Co.

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Electric Service Sup. Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
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Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Pipe Fittings
Westinghouse Tr. Br. Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Electric Service Sup. Co.

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Ohio Brass Co.

Pole Reinforcing
Drew Elec. & Mfg. Co.
Hubbard & Co.

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Bates Expanded Steel Truss Co.
Electric Ry. Equip. Co.
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Poles and Ties, Treated
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Nuttall Co., R. D.

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Elec. Ry. Equip. Co.
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Pumps, Vacuum
Ingersoll-Rand Co.

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Bonney-Vehslage Tool Co.
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Wood Co., Chas. N.

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Ramapo Ajax Corp.

Rail Joints
Carnegie Steel Co.

Rail Joints, Welded
Indianapolis Switch & Frog Co.

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Railway Paving Guards Steel
Godwin Co., Inc., W. S.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse Elec. & M. Co.

Railway Welding (See Welding Processes)

Rattan
Brill Co., The J. G.
Electric Service Sup. Co.
Hale & Kilburn Corp.
Heywood-Wakefield Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Sup. Co.
International Reg. Co., The
Rooke Automatic Reg. Co.

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Amer. Steel & Wire Co.
Carnegie Steel Co.

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Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

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Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
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Westinghouse Elec. & M. Co.

Resistances
Consolidated Car Heating Co.

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Rheostats
General Electric Co.
Westinghouse Elec. & M. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.

Sash, Metal, Car Window
Hale & Kilburn Corp.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

Seating Materials
Brill Co., The J. G.

Seats, Bus
Hale & Kilburn Corp.
Heywood-Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale & Kilburn Corp.
Heywood-Wakefield Corp.
St. Louis Car Co.

Second-Hand Equipment
Electric Equipment Co.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Sup. Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

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Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

Snow Sweeper, Rattan
Heywood-Wakefield Co.

Soldering and Brazing (See Welding Processes and Apparatus)

Spikes
Amer. Steel & Wire Co.

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Lorain Steel Co., The

Splicing Compounds
Westinghouse Elec. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Taylor Electric Truck Co.

Sprinklers, Track and Road
Brill Co., The J. G.

Steel and Steel Products
Morton Mfg. Co.

Steps, Car
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & M. Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Ohio Brass Co.

Strand
Roebling's Sons Co., J. A.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands
Indianapolis Switch & Frog Co.
Ramapo Ajax Corp.

Switches and Switchboards
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track, Special Work)

Tampers, Tie
Ingersoll-Rand Co.
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail, Special Track Work
Rampo Ajax Corp.

Telephones and Parts
Electric Service Sup. Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Sup. Co.

Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
Wharton, Jr., & Co., Inc., Wm.

Tool Steel
Carnegie Steel Co.

Tools, Track and Misc.
Amer. Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Hubbard & Co.
Railway Track-work Co.

Towers and Transmission Structures
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & M. Co.

Track Grinders
Railway Track-Work Co.

Trackless Trollicars
St. Louis Car Co.

Track, Special Work
Barbour-Stockwell Co.
Columbia M. W. & M. I. Co.
Indianapolis Switch & Frog Co.
New York Switch & Crossing Co.
Ramapo Ajax Corp.
Wharton, Jr., & Co., Inc., Wm.

Transfer Issuing Machines
Ohmer Fare Register Co.

Transfer Tables
American Bridge Co.

Transformers
General Electric Co.
Westinghouse Elec. & M. Co.

Transmission Towers & Structures
Amer. Bridge Co.

Treads, Safety, Stair, Car Step
Morton Mfg. Co.

Trolley Bases
Ackley Brake & Sup. Corp.
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Ackley Brake & Sup. Cor,
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

Trolley Materials
Electric Service Sup. Co.
Ohio Brass Co.

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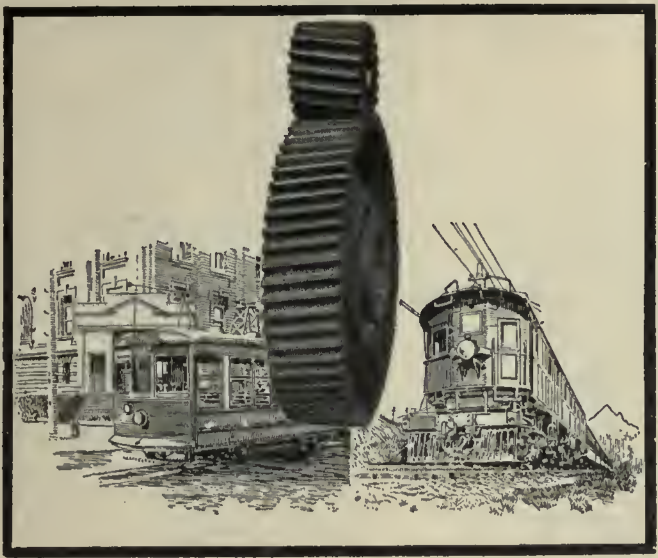

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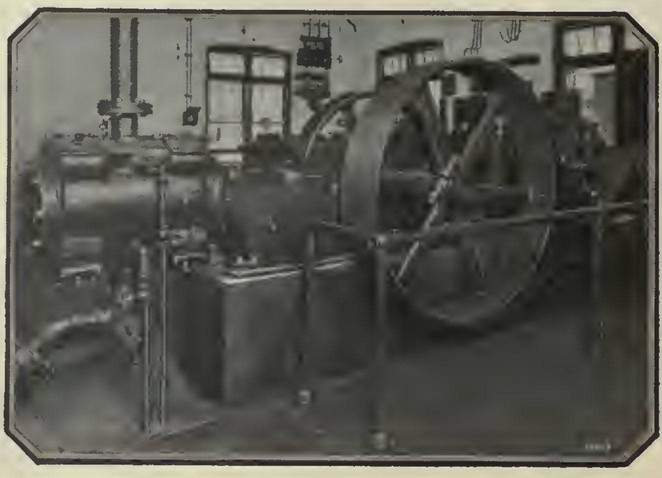

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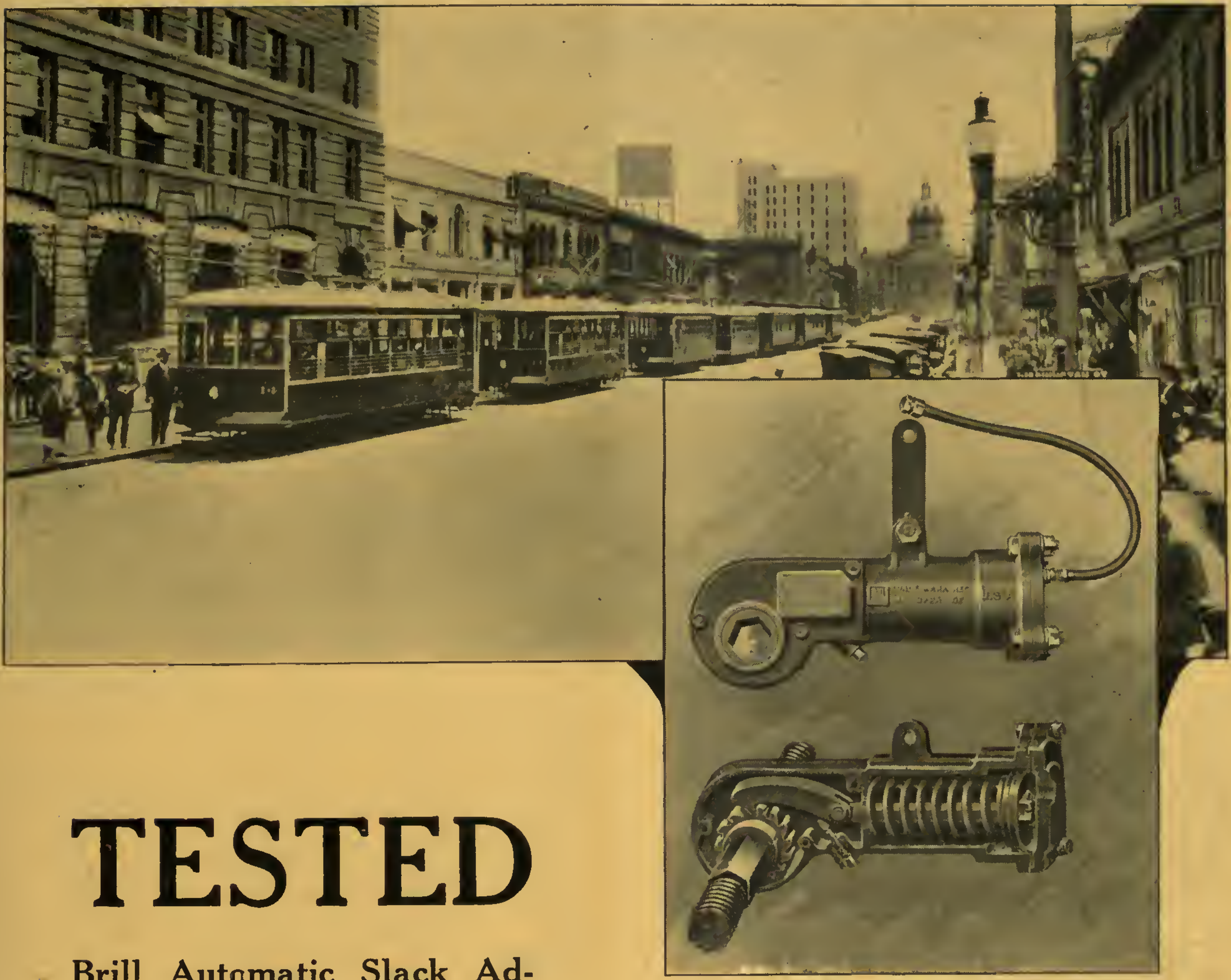

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Northern Texas Trac. Co	1	9
San Antonio Public Service Co	1	29
San Diego Elec. Ry	1	35
Springfield St. Ry	1	20
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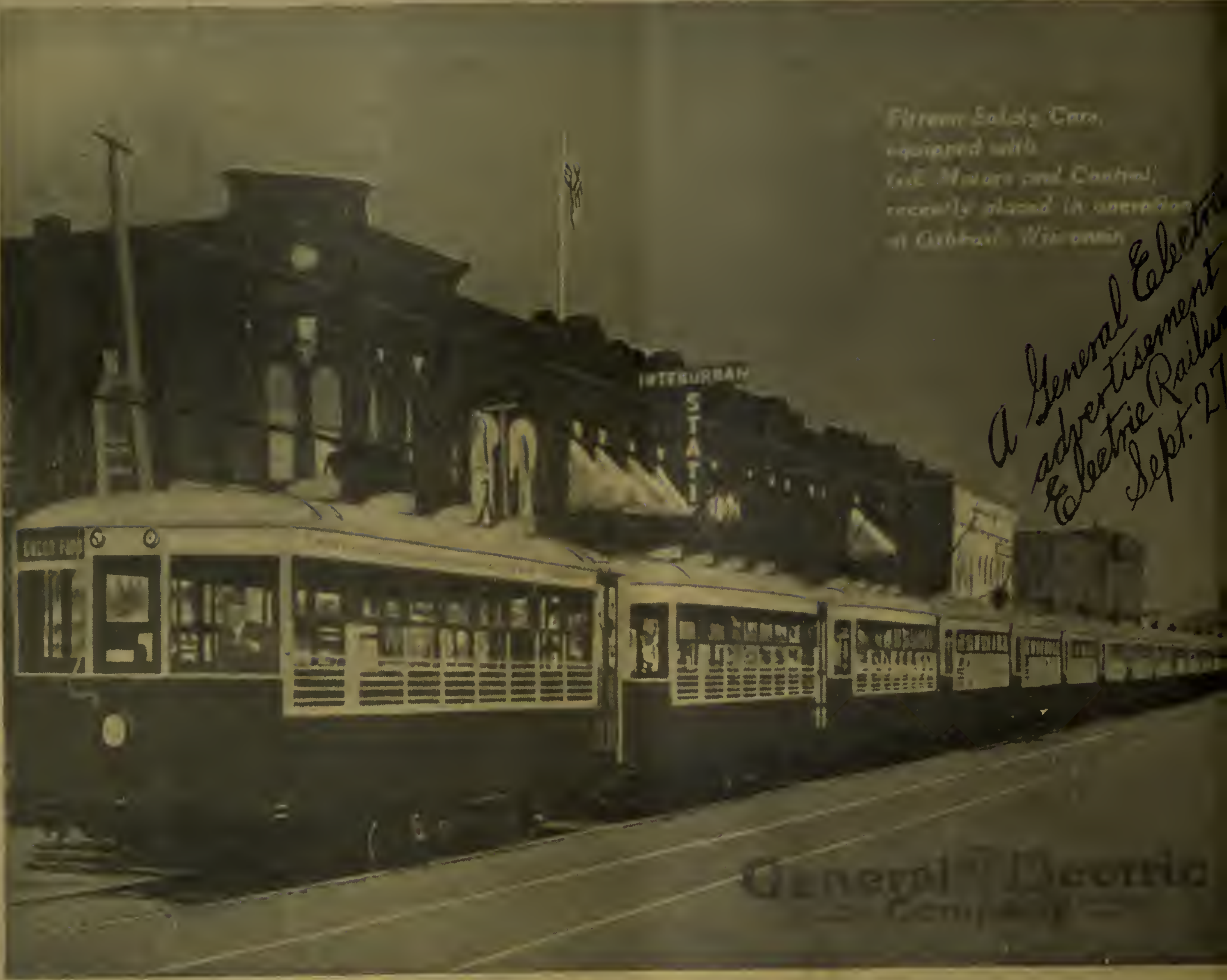

Fifteen Safety Cars, equipped with G-E Motors and Control, recently placed in operation at Oshkosh, Wisconsin

A General Elect
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Electric Railw
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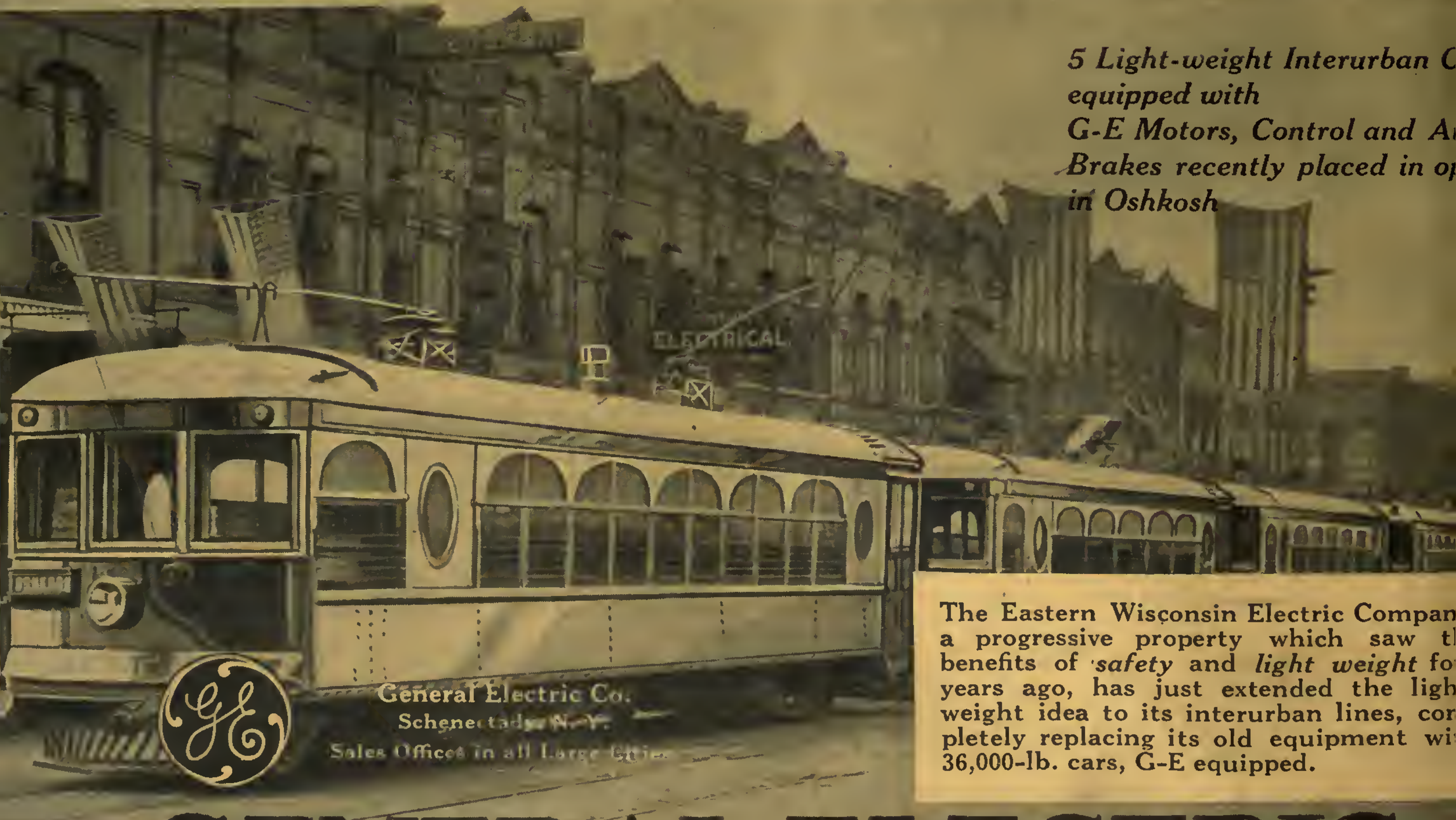

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New York, October 13, 1923

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Printed in U. S. A.

Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
Printed in U. S. A.

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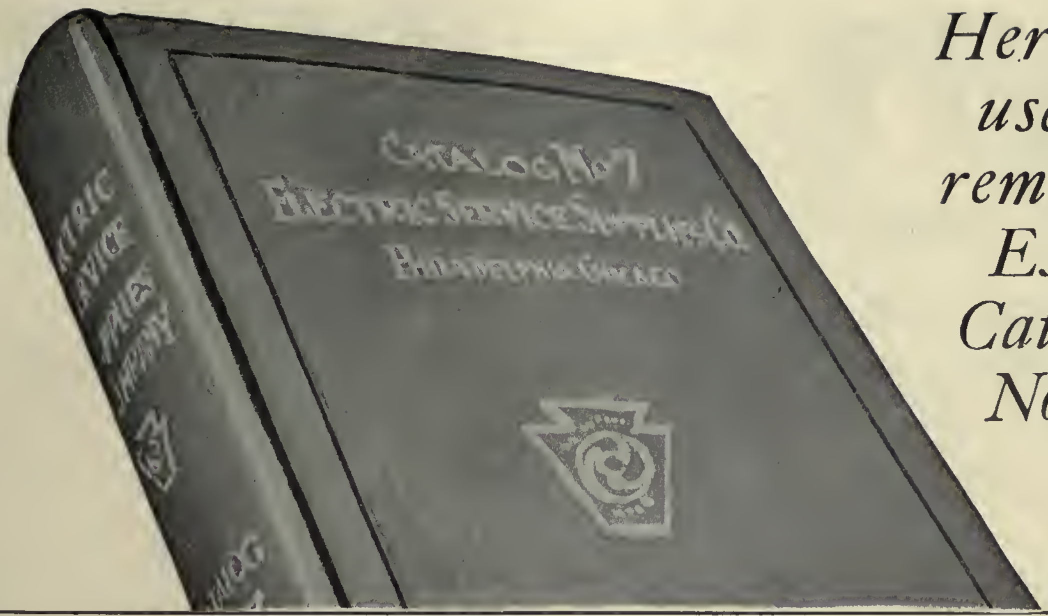

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- Keystone Trolley Catchers
- Shelby Trolley Poles
- Keystone Rotary Gongs
- International Fare Registers
- Fare Register Fittings
- Samson Cordage
- Keystone Air Valves
- Keystone Cord Connectors
- Keystone Trailer Connectors
- Automatic Door Signals
- Standard Trolley Harps
- Standard Trolley Wheels
- Keystone Trolley Line Material
- Locke High Voltage Insulators
- Peerless Armature Shop Tools
- Segur Coil Winding Tools
- Protected Rail Bonds
- Welded Rail Bonds
- Keystone Expulsion Arresters
- Garton-Daniels Arresters

Remember the Lessons of the Convention

Modernized equipment — efficient equipment, better equipment—these ideas went home this year!

When you're thinking of car equipment problems, car design, and maintenance of rolling stock, get the habit of referring to the ESSCO Catalog No. 7. It will recall to your mind many of those hints you got at the A.E.R.A. Convention.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.
PITTSBURGH
829 Oliver Building

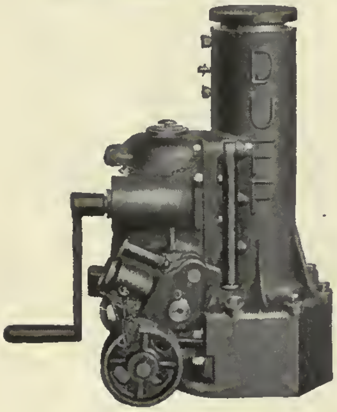
NEW YORK
50 Church St.
SCRANTON
316 N Washington Ave.

CHICAGO
Monadnock Bldg.
BOSTON
88 Broad St.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver
Equipment & Engineering Co., London Eng., Ing S. Belotti & Co., Milano, Italy
L. J. Healing & Co., Ltd., Yokohama, Tokio, Kobe and Osaka, Japan.
Ernest Demoly, Paris, France. Electro-Traccion, Madrid, Spain.

DUFF GENUINE BARRETT JACKS

Duff Genuine Barrett Automatic Lowering Jacks made in a variety of sizes and capacities up to 25 tons. Especially economical, sturdy, quick raising jacks for car work and all-round purposes.



Duff High Speed Ball Bearing Inverted Jacks—50 and 75 ton capacities. Made especially for lifting locomotives and cars loaded to capacity. Include a combination of all the most desirable features in high capacity jacks—send for full description.

Duff Genuine Barrett Light Weight Track or Trip Jacks used as standard tools for constructing, surfacing and ballasting railroad track. Made in various heights and for 10 and 15 ton capacities.

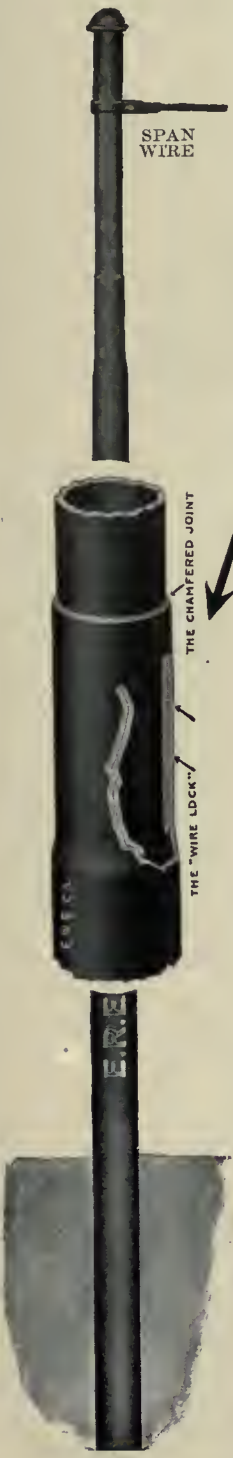
Duff Ball-Bearing Jacks for inspecting or removing bearings from journals. The small head faciliates placing in confined spaces. Has built-in positive stop which prevents raising standard out of base. Capacities, 15, 25 and 35 tons.

The jacks illustrated are a few typical examples of the complete line of Duff Jacks. Send for complete catalog.

THE DUFF MANUFACTURING COMPANY
Established 1883
Pittsburgh, Pa.

New York **Chicago** **San Francisco** **Atlanta** **Houston** **St. Louis**

ELRECO POLES



Our patented "wire lock" swedge joint affords maximum strength

Tubular steel poles have long been recognized as superior in mechanical strength. The only shape that develops full strength in every direction is the circular tube.

To the natural efficiency of the steel tube itself, we have added complete efficiency by making the joints 100% strong with our patented "wire-lock" swedge joint, illustrated at the left. With this Elreco construction, your tubular poles will not telescope or collapse at the joints.

Furthermore, the edge of the outer tube at the joint is chamfered as shown, so there is no pocket to collect moisture or dirt, and start corrosion.

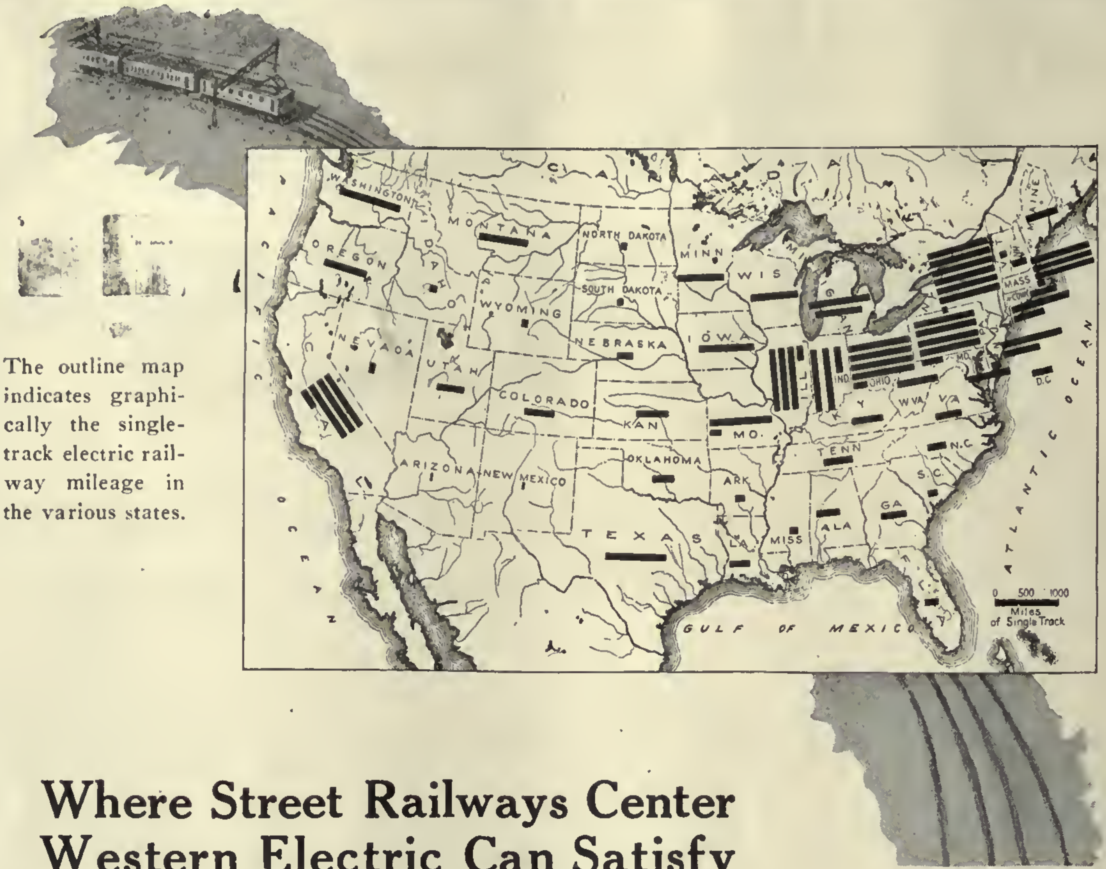
Elreco Tubular Steel Poles require practically no maintenance. There is no easier pole to paint.

ELRECO Combination Railway and Lighting POLES

Elreco Poles in combination with highly ornamented G.E. Novalux Lighting Units, are being widely used to replace unsightly wooden poles, to eliminate duplication of facilities and to reduce costs.

Lowest Cost
Least Maintenance
Lightest Weight
Greatest Adaptability

Electric Railway Equipment Co.
Cincinnati, Ohio
New York City, 30 Church Street



The outline map indicates graphically the single-track electric railway mileage in the various states.

Where Street Railways Center Western Electric Can Satisfy Their Electrical Needs

Naturally continuity of this vital service demands nearby sources of electrical goods for servicing.

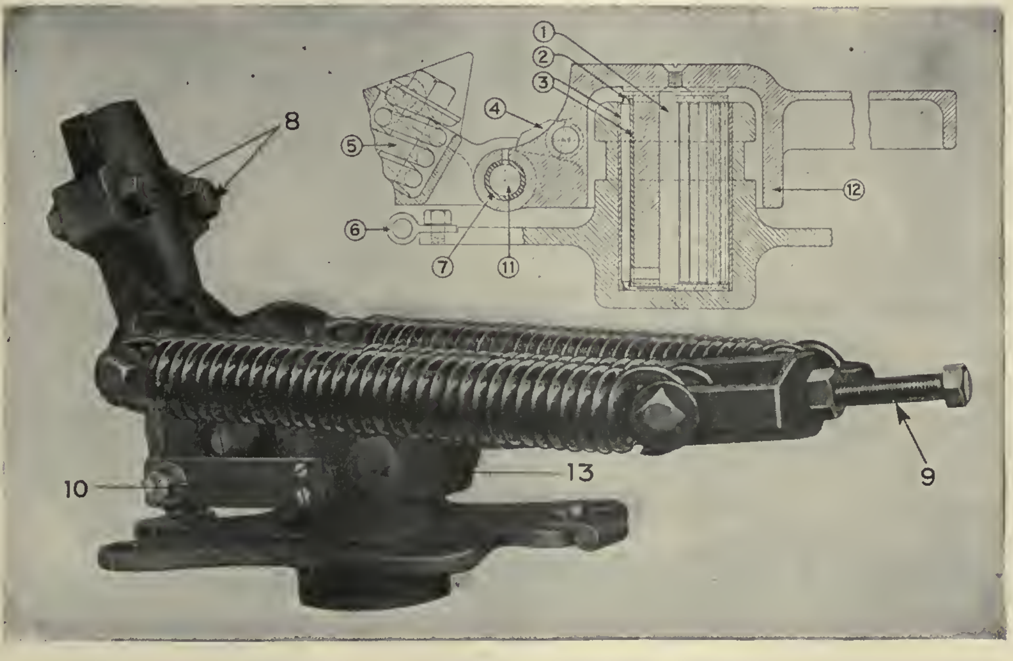
This servicing is provided by Western Electric National Service through its 48 Houses in the centers of trade and transportation named here.

New York
Brooklyn
Newark
Syracuse
Buffalo
New Haven
Boston
Providence
Pittsburgh
Philadelphia
Atlanta
Savannah
New Orleans
Birmingham
Jacksonville
Richmond
Norfolk
Charlotte
Youngstown
Chicago
Indianapolis
Detroit
Milwaukee
Grand Rapids
Cleveland
Minneapolis
St. Paul
Duluth
Baltimore
Kansas City
Oklahoma City
St. Louis
Memphis
Omaha
Cincinnati
Columbus
Nashville
Dallas
Houston
San Francisco
Oakland
Los Angeles
Seattle
Portland
Spokane
Tacoma
Denver
Salt Lake City

A NATIONAL ELECTRICAL SERVICE

Western Electric Company

OFFICES IN ALL PRINCIPAL CITIES



Lest You Forget

The Famous Fourteen Points have passed into history and almost into oblivion, while the Nuttall Thirteen Points and the Famous Nuttall 13-E Trolley Base are daily making enviable service history

1. **Oil Reservoir.** Positively retains oil or grease and is exclusively a 13-E feature. To fill, remove the flat-head screw shown in top of swivel cap.
2. **Rollers and Cage.** Rollers are hardened and assembled in a cage, which maintains alignment and permits assembly as a unit.
3. **Races—Inner and Outer.** The races are made of "SHELBY" tubing, machined, hardened and ground.
4. **Trigger Lock.** Locks Pole Socket in horizontal position, enabling one man to change poles in the barn under low headroom.
5. **Buffer Spring.** Cushions the pole socket in case the wheel leaves wire.
6. **Terminal Connector.** Cast Bronze Connector for sweating to Motor Lead insuring good contact. Clamp type furnished if preferred.
7. **Pole Socket Bearing.** Hardened Steel Bushing maintaining indefinitely a good close fit with axle pin No. 11.
8. **2-Bolt Pole Socket.** Two bolts insure firmer grip and require less time for applying pole.
9. **Adjusting Screw.** One adjustment for all four springs.
10. **Shunts.** Heavy phosphor bronze straps for shunting the current from Pole Socket and Swivel to Base.
11. **Axle Pin.** Pole Socket Axle Pin made of hardened steel.
12. **Dust Guard.** Protects Roller Bearing from dust and water.
13. **Accessibility.** By removing these heavy locking screws and unhooking springs, the bearing cap can be removed, exposing swivel portion of base.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

IRVINGTON INSULATION

—the only line that meets your needs 100%

Irvington Products meet your requirements 100%. They include every kind of insulation manufactured: cloth, paper, liquid, tubular and solid. And the Irvington line is the only one that does. If you must have a special condenser for your radio set or insulation for rebuilding a turbo-generator, Irvington is prepared to serve you.

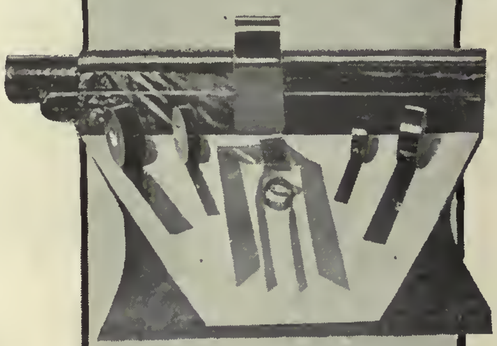
And Irvington products are thoroughly dependable. Years of constant service in every type of electrical machinery, and in insulated wires and cables have given conclusive proof of their ability to stand up under the most trying conditions.

Irvington Products are the result of 18 years of experience—they possess the greatest dielectric strength of any insulating materials ever produced.

The secret of Irvington Insulation success lies in its seven factors of quality. Irvington Products are famed for high resistance, high dielectric strength, non-hygroscopic qualities, heat resistance, resistance to chemical action and maximum elasticity.

If you need insulating materials of any kind—insist on the best—Irvington and nothing less.

Ask for samples and prices.



Irvington Varnished Silk is made to meet your specification, for magnetos and all fine instrument work where a maximum dielectric strength is required with a minimum thickness.

Varnished Cambric tape—black and yellow.

IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.
Established 1905

Sales Representatives:

Mitchell-Rand Mfg. Co., New York
T. C. White Electric Supply Co., St. Louis
E. M. Walcott, Rochester
L. L. Fleig & Co., Chicago

Consumers Rubber Co., Cleveland
Clapp & Lamoree, Los Angeles and San Francisco
F. C. Scofield, Toronto

ABSOLUTELY FIRE ROOF FACTORY

Rustless
Less Weight

ALUMINUM RIGID CONDUIT

Aluminum conduit, $\frac{3}{4}$ in. size, runs $2\frac{1}{2}$ ft. per lb. It weighs only about one-third as much as ordinary metal conduit. Aluminum conduit for car construction saves weight as does aluminum tubing for air lines.

Aluminum is resistant to corrosion, easy to handle and install—and it saves two-thirds the weight.

Mail the attached coupon if you are interested in weight saving, through the use of aluminum conduit, tubing, castings, sheet, etc.

Aluminum Company of America
Pittsburgh, Pennsylvania

OFFICES

Albany
Boston
Buffalo
Chicago
Cleveland
Dayton
Detroit
Indianapolis
Kansas City
Minneapolis
New Haven
Newark
New York
Philadelphia
Pittsburgh
San Francisco
St. Louis
Washington, D. C.
Export Sales
New York

Aluminum Company of America

Gentlemen:

I am interested in aluminum for ....

....

Please send ☐ Representative.
☐ Information.
☐ Sample.

....

W. ....

Please mail Coupon to nearest office.

Is she the widow of one of the men who worked for you?

WHAT do you do when the office manager, the superintendent, a department head, or a foreman reports that one of your employees has died?

You probably wonder about his family, and take steps to find out if they are in want and if you can do anything. You probably learn that he has saved little or nothing and that his life insurance, if any at all, was pitiably inadequate. Possibly you learn that his friends have passed the hat for the benefit of his widow, his children, or his mother.

Did you ever think what a fine thing it would be each time an employee died for you to set in motion the machinery that would remove the financial worry from the bereaved home and provide funds for the reorganization of the worker's family? Do you realize that you could, by use of the telephone, or telegraph, call in a man who, by temperament and training is fitted to visit that bereaved home in company with you or a representative from your organization—a man who can then and there, or within a few hours, issue a draft to the widow for the money that she needs immediately plus the money that she will need to readjust affairs within the family circle?

Do you realize that such a draft would not be on you, but upon the treasury of an insurance company?

Do you realize the good that payments like these will accomplish?

When you buy Group Life Insurance you are making arrangements to use machinery that will take care of the families of your employees without making those families feel the sting of charity.

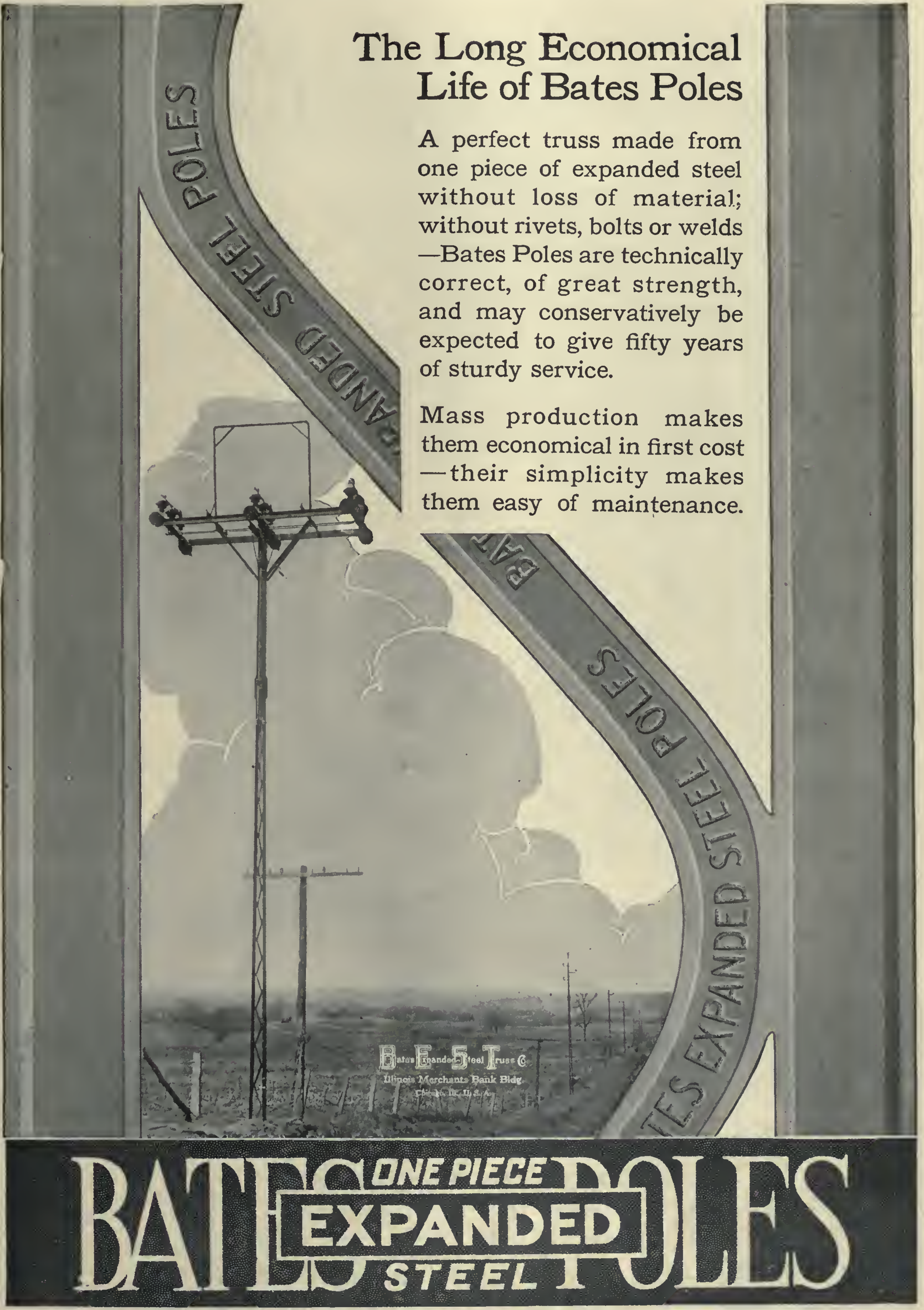
To provide Group Insurance for your employees is to do the fine, big, generous thing by them and their families. Group Insurance as conducted by The Travelers Insurance Company functions to the satisfaction of employer, employees, and employees' families. Death claims are paid within a few hours of the time notice is given the Company either at its home office or at one of its many branches.

THE TRAVELERS INSURANCE COMPANY — THE TRAVELERS INDEMNITY COMPANY
Hartford — L. F. BUTLER, PRESIDENT — Connecticut

THE TRAVELERS

ACCIDENT, LIFE, LIABILITY HEALTH, AUTOMOBILE, STEAM BOILER, COMPENSATION GROUP, BURGLARY, PLATE GLASS, AIRCRAFT, MACHINERY

Send for this portfolio, "Group Insurance Data." It contains a brief, yet comprehensive survey of this important business subject. Write on your business letterhead.



The Long Economical Life of Bates Poles

A perfect truss made from one piece of expanded steel without loss of material; without rivets, bolts or welds —Bates Poles are technically correct, of great strength, and may conservatively be expected to give fifty years of sturdy service.

Mass production makes them economical in first cost —their simplicity makes them easy of maintenance.

Bates Expanded Steel Truss Co.
Illinois Merchants Bank Bldg.
Chicago, Ill., U.S.A.

BATES EXPANDED STEEL POLES
BATES EXPANDED STEEL POLES
B E S T
BATES ONE PIECE EXPANDED STEEL POLES

We Know the Quality Is There and Want to Prove It to You

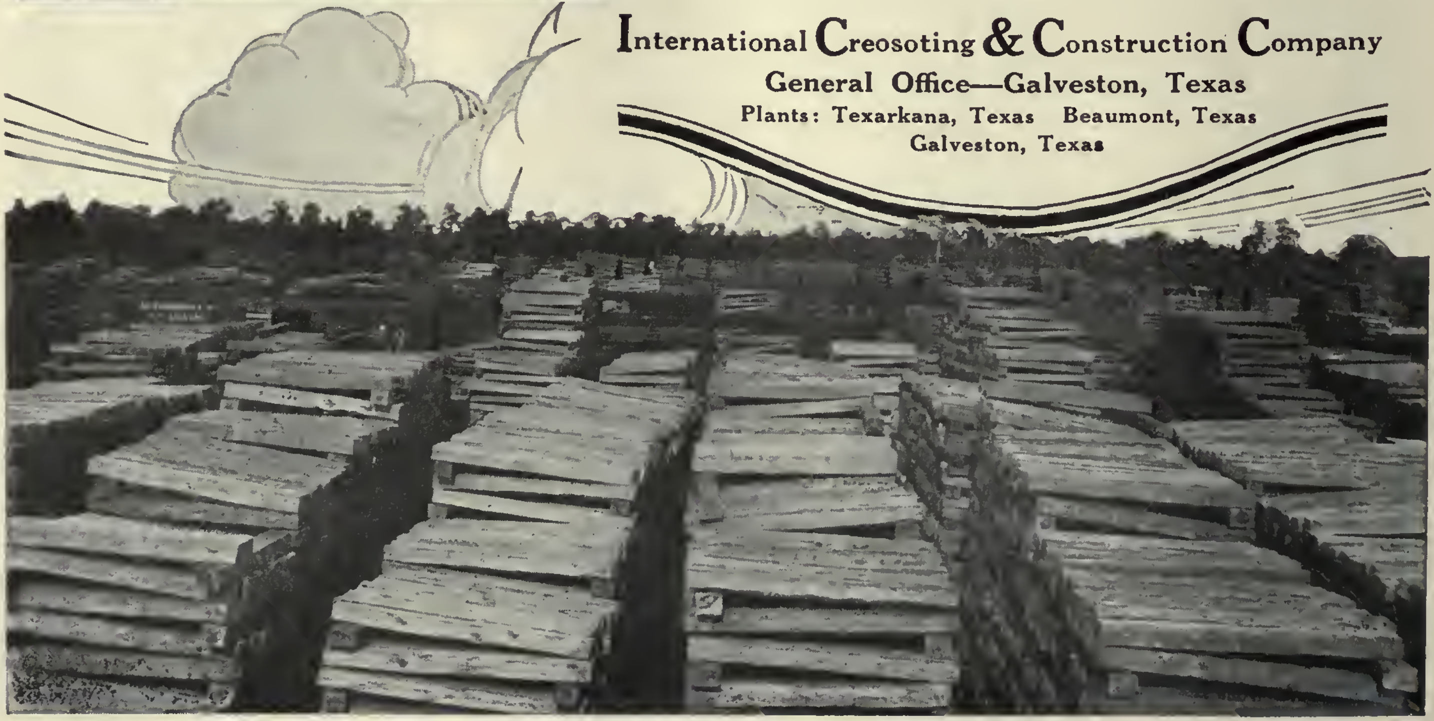
"ACTIONS speak louder than words"—that's why we place our I. C. C. Co. Dating Nail on every International Tie before it leaves our plants. This stamp of approval is not only an indication that we know the quality is there, but it demonstrates our willingness to stand behind our ties and our desire to prove to you that the quality is there, by having the name International connected with our ties during their entire life.

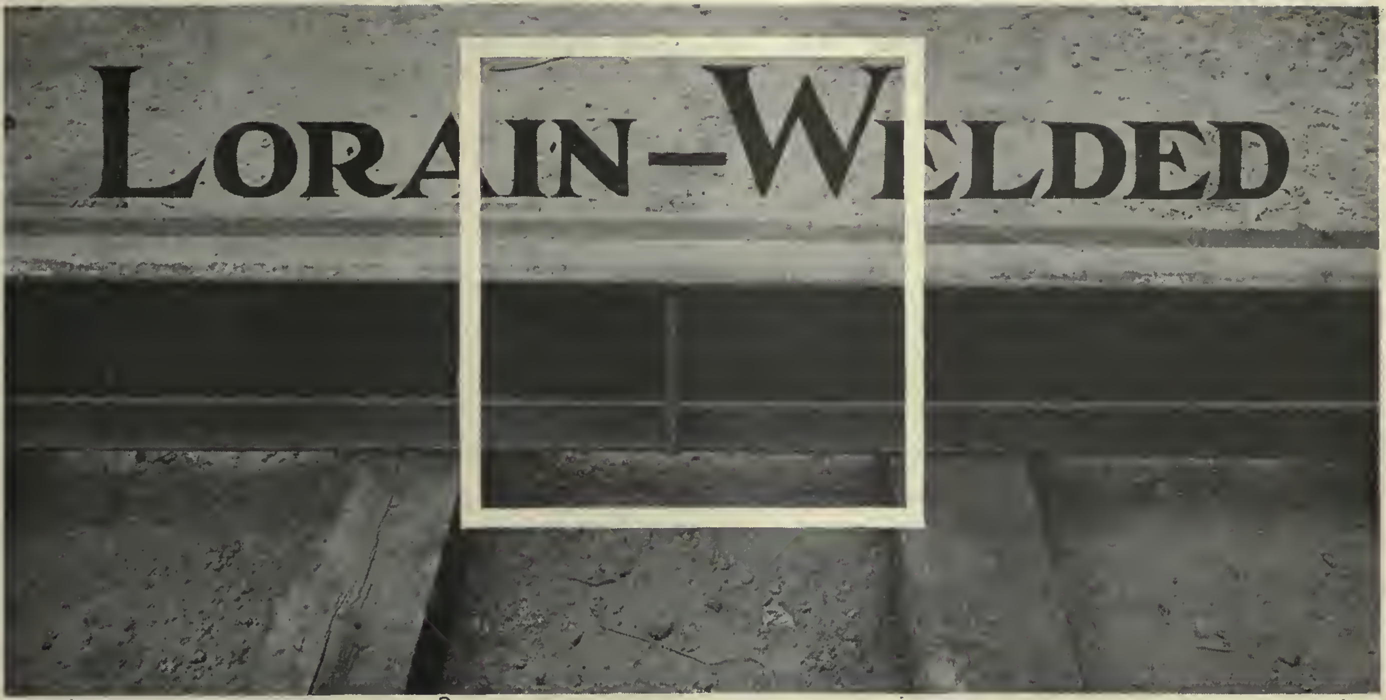
We are doing this because it is only fair that these conscientiously produced ties—sound from the very start, full size, carefully supervised through the production, inspection, grading, seasoning and treating periods, should be identified from "Just ties" of uncertain quality. The I. C. C. Co. Dating Nail will tell the International Story. It represents a big and important step in the Tie Industry and is the best assurance of quality that can be offered to a tie consumer.

Take advantage of this opportunity—contract now for your 1924 ties—so that we can accumulate them—season them—treat and ship them next year as your needs demand.

Write for full particulars.

International Creosoting & Construction Company
General Office—Galveston, Texas
Plants: Texarkana, Texas Beaumont, Texas
Galveston, Texas





—and that means *forged at the same time*

To make a satisfactory track weld—a weld that will not break down; that will not crack or "cup" in service — the steel must be forged while it is still hot.

The only processes which *weld* and at the same time *forge* the steel, are

The Two
LORAIN PROCESSES
of
ELECTRIC WELDING
Butt and Bar Weld

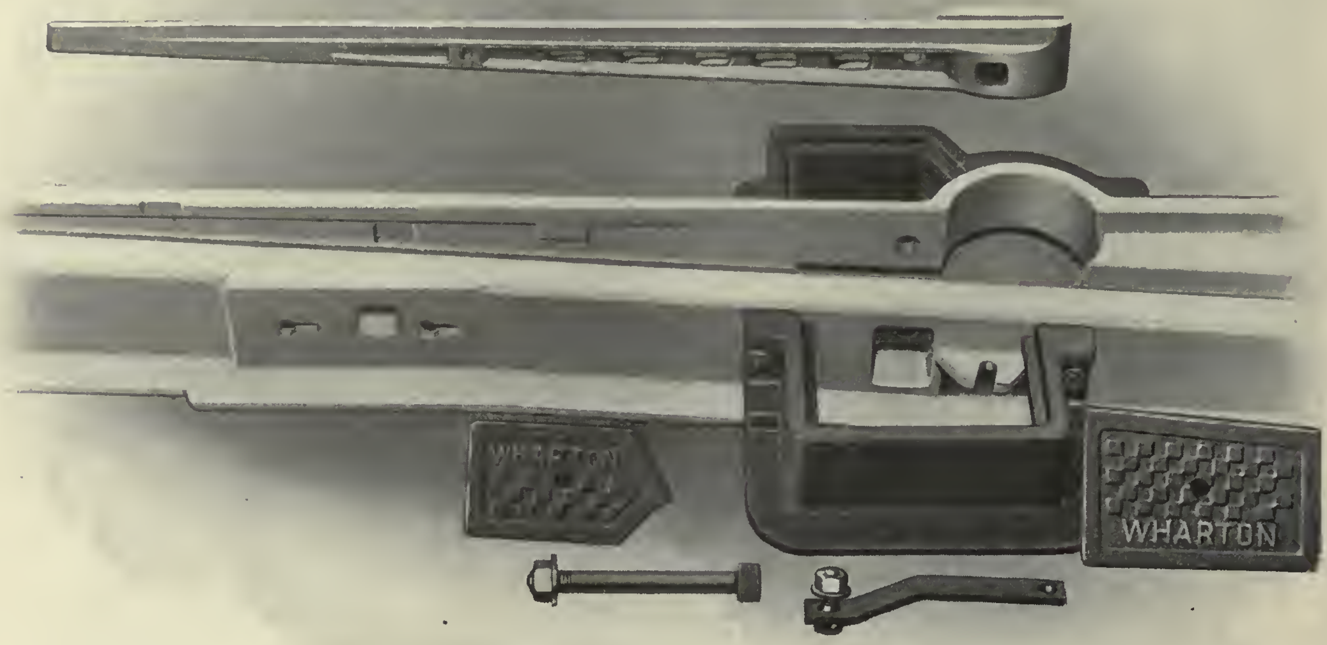
Catalogue Mailed on Request

The Lorain Steel Company
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh
Pacific Coast Representative: United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative: United States Steel Products Company, New York, N. Y.

Girder Rails—Special Track Work—Frogs—Mates—Switches—Crossings, Etc.

BENEFIT BY THE RESOURCE



Slanting Bed Tongue Switch
(Patented)

Switches—Mates—Frogs—Crossings
Layouts
of all types and constructions

Originators of
MANGANESE STEEL TRACKWORK

WHARTON TRACKWORK

F A PIONEER ORGANIZATION

The master-minds of railway operation have chosen

Wharton Trackwork

Their precedent is your guarantee

THIS Slanting Bed Tongue Switch was exhibited at the A.E.R.A. Convention in Atlantic City, where it created very favorable comment.

The railways' representatives were loud in their praise of its distinctive features, embodying:

- The slanting bed and tapered tongue.
- The novel heel tightening device on the principle of a split collar or clamp, insuring a snug fit of the circular heel portion or pivot of the tongue.
- The strong, deep "I" beam section tongue presenting an uninterrupted surface in one plane, giving a continuous bearing on the machine ground bed, for its entire length.

Illustrations with descriptive details will be gladly mailed on request.

WM. WHARTON JR. & CO., Inc.
EASTON, PA.

SALES OFFICES:
Boston, Mass.
Chicago, Ill.
Denver, Colo.
New York City
Philadelphia, Pa.
Pittsburgh, Pa.
San Francisco
Scranton, Pa.

WHARTON TRACKWORK

and Now the Way

Says

The 1923 Committee on Way Matters, of the A.E.R.E.A. reported at the Atlantic City Convention, as follows: "It was agreed that a substitute tie should meet the following requirements.

1. Resiliency.
2. Hold rail to gage.
3. Provide sufficient bearing area.
4. If expected to last for more than one set of rails, that easily renewable fastenings be provided.
5. Be easily installed by ordinary track workers.
6. Cost installed should be reasonable.

See Report of the Committee on Way Matters of the A. E. R. E. A.—Page 12—Bulletin 310

DAYTON

Committee "Resiliency"

Known Features of Dayton Resilient Tie:

The fundamental principle of the **DAYTON RESILIENT TIE.**

Held securely by bolts accurately located in steel cross members.

By protecting the concrete from breaking or pulverizing the Dayton Tie converts the entire roadbed into bearing surface.

Readily accessible bolt fastenings provide for rail renewal.

Eight ordinary track laborers, by actual test, have laid 1000 feet of Dayton Resilient track in a single day.

Dayton Resilient Tie Track costs $2000 per mile less than wood ties in gravel ballast.

Resilient TIE

The Dayton Mechanical Tie Co.
707 Commercial Building, Dayton, Ohio

Canadian Representative:
Lyman Tube and Supply Co., Ltd., Montreal, Quebec

Cambria Car Wheels and Axles

for Electric Railway Service

Rolled Steel Wheels and Axles for electric railway service have long been manufactured at the Cambria Works of Bethlehem Steel Company and are well-known throughout the field for their uniformity of material and superior workmanship.

From the raw materials entering into the production of pig iron, through the various stages of steel manufacture, great care is taken in the selection of proper grades of material, and with the use of modern equipment, axles and wheels undergo exceptional refinement in structure.

Bethlehem manufactures many other products for the electric railway field. A partial list includes rails, trackwork, splice bars, bolts, spikes, tie plates, tie rods, and pole line material.

Use Bethlehem Selflock Bolts on all Electric Railway Equipment where you require bolts with tight nuts—nuts that will stay where they are placed.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

Sales Offices:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh
Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

A Great Development

The

UNA JOINT

Features

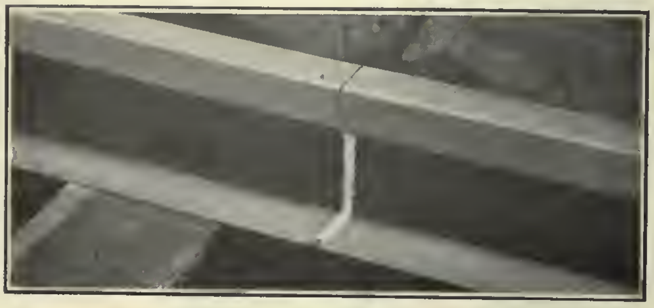
1. An electric seam welded joint of great strength.
2. Mechanical construction based on approved engineering principles.
3. Exceptionally strong welded seams with Una Joint Rod.
4. Applicable to both old and new track.
5. Installed under traffic without delays.
6. Extreme portability of welding apparatus.
7. Welding apparatus also suitable for all classes of electric welding.
8. Particularly adapted for smaller railway properties as well as large.
9. A joint of long life as determined by severe tests.
10. Economical and efficient.

Rail Welding & Bonding Company
Cleveland, Ohio

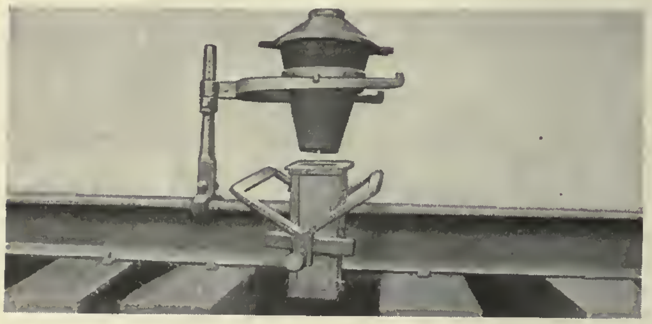
Manufacturers of

UNA BONDS

FERALITE



The Start:— Rail ends are butted and lined up, then an opening is cut through the base and web, up to the rail head, using the oxy-acetylene torch.



The Process:— The molds are adjusted and clamped, the rail is heated to welding temperature, the aluminothermic reaction is carried out, and the superheated steel is tapped into the mold.

Finished Feralite Weld:— The result is a solidly fused pair of rails, as strong mechanically and as continuous electrically as any part of the original rail.

(At Milwaukee, Wis.)

If you want to know:

all the details, the cost, and the places where FERALITE has been used, write today. Ask for Booklet B.

ALUMINO-THERMIC
FERALITE
TRADE MARK
WELDING MIXTURE

The latest development in aluminothermic welding process.

The advantages of this kind of weld over the ordinary rail joint are too well known to need enumeration. It lasts as long as the rail, does not cup, requires no maintenance and eliminates the expense of rail bonds. Of more interest to the well-informed railway man, is the fact that the **FERALITE Process** puts this type of weld on a practical basis—uniform, efficient and economical.

To meet the insistent demand of electric railway engineers for a uniform product and an economical process, as applied to aluminothermic welding of rail joints, this Company was formed to develop and market the **FERALITE Process.** We secured as Consulting Engineer, the famous Professor Hans Goldschmidt, known the World over as inventor of the aluminothermic process for welding iron and steel.

Features of Feralite

Foremost among the many purely mechanical advantages of the **FERALITE Process,** is the fact that nothing intervenes between the original rail heads. They are butted together and welded solid. This permits an absolutely correct alignment to be made, and eliminates the lack of uniformity which may occur if any other metal is introduced between the original rail heads. When welding old rails, it is not necessary to cut out any part of the rail head—the **FERALITE Process** cares for them as they are.

Uniformity of the mixture is insured when you use **FERALITE.** It is manufactured and mixed in our plant, under constant personal supervision of an expert in this process. Because of the use of nothing but highest grade pure materials, accurately portioned as to chemical contents and suitably mixed, **FERALITE** steel is free from impurities, blow holes, and hard spots, when poured into properly-prepared molds.

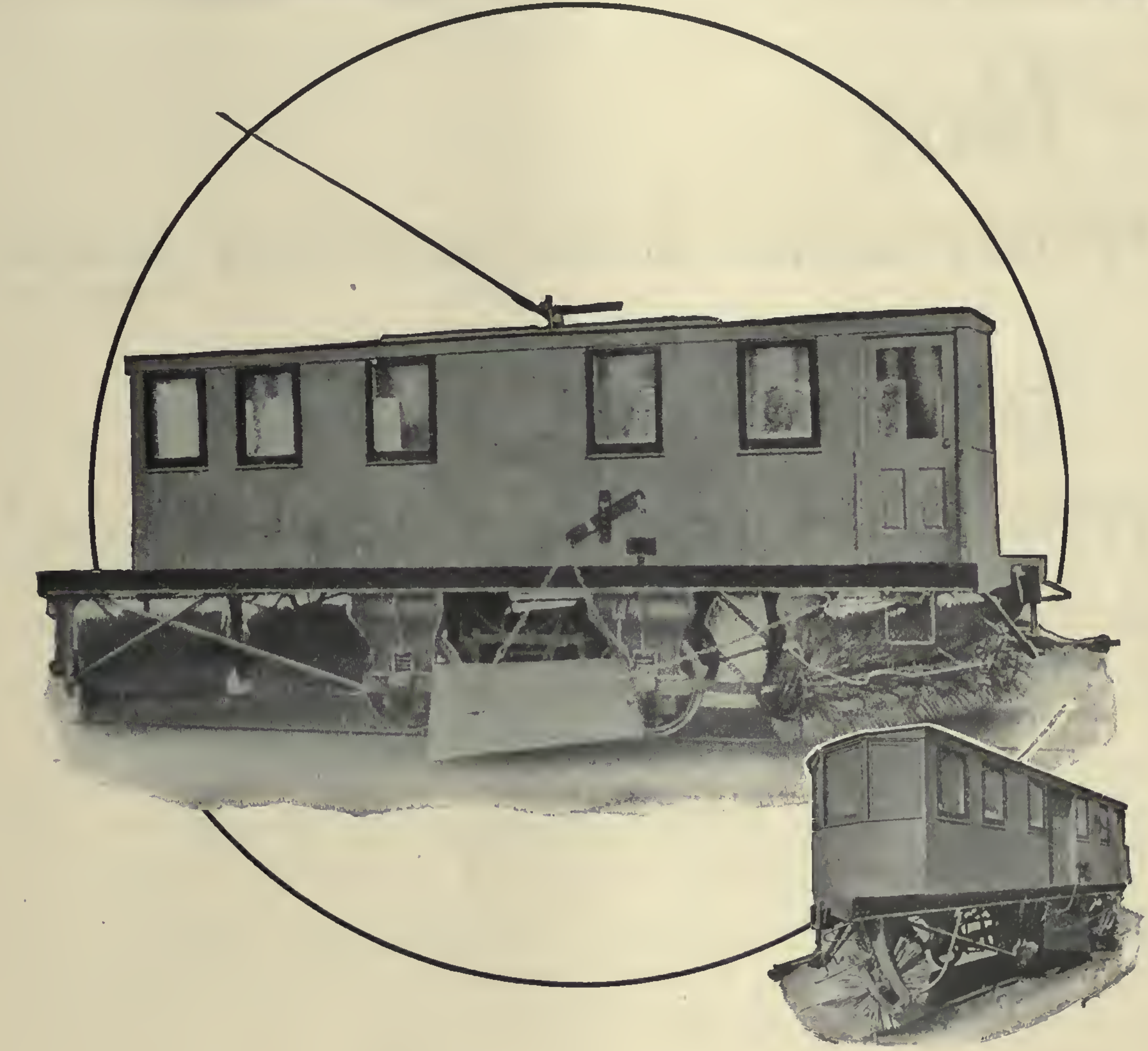
By means of the **FERALITE Process,** which butts the rail ends, there is little or no excess metal to be ground.

Crucibles and apparatus which we furnish are light in weight, but amply strong. Our special rail crucible holder, shown in the illustration, is designed to permit quickest adjustment and centering.

When it comes to *costs,* we are prepared to show you that there is a possibility of real economy in aluminothermic welding. Our equipment is inexpensive, but practical and rugged, and you will find our scale of prices on **FERALITE** portions most attractive.

ALUMINO-THERMIC CORP.
Roselle Park, N. J.

SNOW!—its Removal



Efficient Snow-sweepers and McGuire-Cummings Mfg. Co. are names linked together in the mind of a majority of America's electric railway men. Fully 95% of all electric snow-sweeping equipment used in the United States and Canada is of McGuire-Cummings make.

The Standard single truck, steel underframe, long broom sweeper shown above is exceptionally strong and rigidly built, handling deep snow rapidly without stalling. The long broom clears both rails and fifteen inches additional on the outside of each track. Each broom is equipped with case-hardened roller bar steel belt chain, with detachable links.

Over 1,400 of these long-broom sweepers are in use in all parts of the world where they have snow to contend with. Sweepers are also built in other types to cover every snow-fighting problem.

McGUIRE-CUMMINGS MFG. CO.

General Offices

111 W. Monroe Street, Chicago, Ill.

City and Interurban Cars and Trucks, Safety Cars, Combination and Work Cars, Snow-Sweepers, Electric Locomotives.

Not
What does Lubrication Cost—
but
What can Lubrication Save!

At the end of the year when the balance sheet goes out, some clerk will post an item: "COST OF LUBRICATION".

As figures go, the cost will not be large. Compared to the Total Cost of Operation, it will be very small, and it will be small too compared to the item of Maintenance Charges.

Now, even if that Cost of Lubrication is smaller than last year, it does not necessarily prove that the road is saving any money.

That is not the place to look for savings.

The right place is to go back to the shops and see what effects lubrication has had on:

Renewal of bearings
Replacement of gears and pinions
Repairing of compressors
Replacement and repair of miscellaneous mechanism.

These are the things that count and that is

TEXACO
THE TEXAS COMPANY
DEPT. R-J. 17 BATTERY PLACE - NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES
TEXACO

the way to judge—by the Results of Lubrication.

That's Logic—and good business.

Good business for the line and good business for Texaco Lubricants.

For we want to be judged only by what we do *on the cars* and not by what is shown on some sheets.

What Texaco Lubricants are doing on the cars for hundreds of millions of car-miles is putting them and keeping them on more and more lines all over the country.

* * * * * * * *

If your road is using Texaco Lubricants you can readily understand the growth of our business.

If you haven't taken up with Texaco yet, you will appreciate this short statement of what Texaco stands for:

1—Suitable lubricants sold at a price that is fair to the customer and to us.

2—Texaco Lubricants are manufactured exclusively at The Texas Company's Refineries and, hence, they can be backed up by a positive assurance of uniformity and efficiency.

3—Prompt delivery of every kind of lubricant used by the Electric Street Railways, whether for rolling stock, shop or power plants.

4—Prompt delivery of burning oils, or gasoline, if you need them.

5—Unstinted Engineering Service through experienced and capable lubricating engineers.

6—A degree of friendly co-operation you never realized until you took up with Texaco.

When do you want to take it up with us?

It will put you under no obligation to have a well equipped Texaco Engineer call and explain why Texaco dosen't often lose a customer—and if you wish it, this man will be glad to inspect your property and tell you just what can be accomplished in lower maintenance cost through improved lubrication.

Not
What does Lubrication Cost—

but
What can Lubrication Save!

(Continued fr. opp. page)

TEXACO
THE TEXAS COMPANY
DEPT. R-J. 17 BATTERY PLACE. NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES
TEXACO

Rail Bonds

Type ET

Type EC

Brazed Bonds

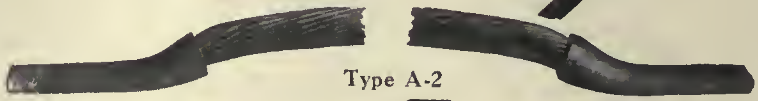
Erico Brazed Bonds are made in various types for application to the ball of the rail; to the web, either concealed under, or external to, the splice bar; and for cross bonding. Standard types furnish any electrical capacity from 2/0 to 400,000 C.M.

The ribbon, stranded or rope lay copper conductors of Brazed Bonds permit a choice of bond best suited for the most varied conditions of track. Both the standard and "Champion" terminals furnish the "eight to one" contact of steel rail to copper bond terminal.

Type AT-F

Arc Weld Bonds

For temporary, and pick up bonding Erico Arc Weld Bonds are extremely convenient. The heavy forged iron terminals of either head of rail Type AT-F, or foot of rail Type A-2 permit the use of high welding currents and rapid application. Any capacity from 4/0 to 400,000 C.M.



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Every power house — every factory that utilizes electrical equipment—has extra hazards added to its other fire risks. Only a fire protection engineer can make sure that protection is adequate and properly installed to cover every risk.

International Newsreel

More power—better light—
but greater fire risk

and only a Fire Protection Engineer can guard you against serious loss

ELECTRIC fires, like all other fires, can be surely controlled at the start. That they frequently are not controlled, is due to *inadequate or incomplete installation* of fire protection.

There has been some excuse for it, because only recently was a complete, unprejudiced service made available to insure *correct* installation. Today you need take no chances. You can have assurance against serious loss from any fire risk, whether it's electricity, oil, paint, gasoline, chemicals, or ordinary hazards.

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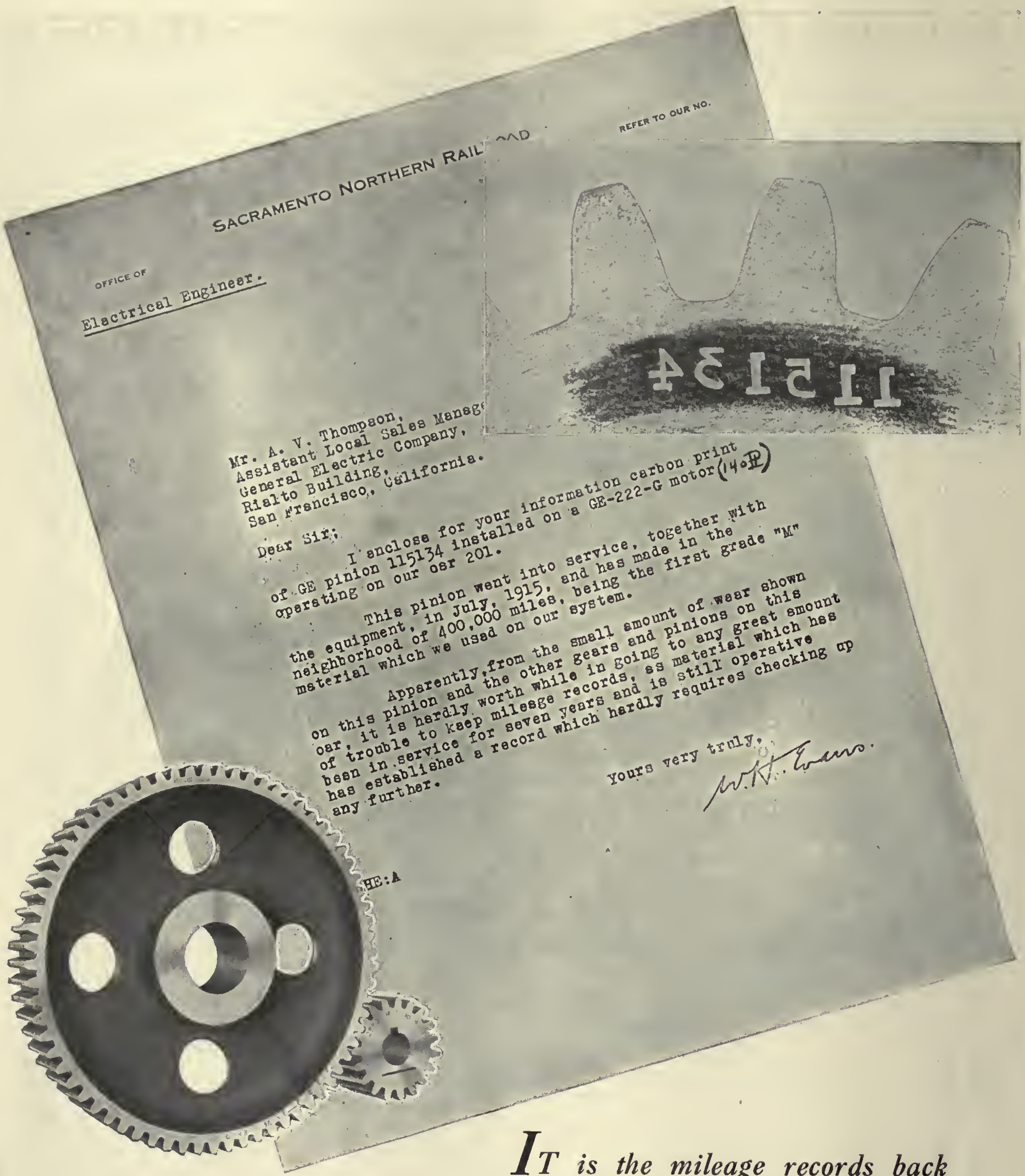

SACRAMENTO NORTHERN RAIL AD

REFER TO OUR NO.

OFFICE OF

Electrical Engineer.

Mr. A. V. Thompson,
Assistant Local Sales Manag
General Electric Company,
Rialto Building,
San Francisco, California.

Dear Sir:

I enclose for your information carbon print of GE pinion 115134 installed on a GE-222-G motor (14-P) operating on our car 201.

This pinion went into service, together with the equipment, in July, 1915, and has made in the neighborhood of 400,000 miles, being the first grade "M" material which we used on our system.

Apparently, from the small amount of wear shown on this pinion and the other gears and pinions on this car, it is hardly worth while in going to any great amount of trouble to keep mileage records, as material which has been in service for seven years and is still operative has established a record which hardly requires checking up any further.

Yours very truly,
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HE:A

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GENERAL ELECTRIC

New York, Saturday, October 13, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 15

Some Aspects of the 1923 Convention

THE convention this week at Atlantic City is one of the greatest the American Eletric Railway Association has held. It establishes a new record both as to registration, the final being 4,347, and as to amount of exhibit space sold, which was 76,276 sq.ft. The exhibits were most interesting and attractive, and the exhibit hall was never before so beautifully decorated. The layout of exhibit space was also favorably commented upon this year.

A feature of the exhibits that was noticeable and much talked about was that 24 per cent of the total space sold was for buses. More than thirty buses were shown, but strangely enough not one railway car (except the Toonerville Trolley, which made quite a hit for one of the exhibitors). On the other hand there was no end of railway equipment and maintenance materials exhibits, but no maintenance equipment for buses. While it is realized that it entails a very high expense to ship a complete car to Atlantic City, nevertheless it seems rather surprising that there should have been a total absence of cars at this convention in view of the very great interest and activity that have been shown in car design and construction during the past year.

The convention meetings were well attended and all arrangements seem to have been perfectly made. The program of the American Association was particularly full and this necessarily limited discussion to a very small amount. However, it is questionable whether substitution of discussion for some of the formal matter would have added value to the proceedings.

There has not been time as yet really to get a perspective of what was mainly accomplished by this convention. It differs from some preceeding conventions in that there seems to be no outstanding theme, though the meetings were certainly constructive and helpful. Apart from the meetings, however, two observations may fairly be made as characterizing the forty-second convention. The manufacturers were made most optimistic by the real buying interest of the railway men, the comment being that heretofore the visits to exhibitors' booths were more a matter of curiosity and handshaking than for the purpose of preparing for purchase. This of course is a very definite reflection of the improvement that has come in financial conditions in the industry.

The other observation in mind is that this convention undoubtedly marks the turning point in the predominent sentiment of the railway men from one of antagonism toward the bus to one of appreciation that it is a new transportation tool which they may well endeavor generally to bring into use in its proper sphere. The desire to quash the bus by fair means or foul has now largely been replaced by the more constructive attitude of studying how best to capitalize on the new vehicle.

What Is a Public Service Commission?

FIVE public service commissioners from as many states addressed the association at the Atlantic City convention. It was to be expected that these commissioners, devoting their time as they do to the study of utility problems, are all consistently in favor of the principles of commission regulation as an improvement over older methods of legislative and court procedure in governing utility operation. Nor was it surprising that, in analyzing the practice of commission regulation, these men should bring forward such varied reasons for lack of perfection that it might have seemed, even to themselves, that they were of different minds fundamentally.

But it is both important and significant that a real analysis of what they said shows that there is one fundamental idea underlying their thinking. This is that there is as yet neither in law nor in the public mind a clear conception of the commission's true function. The very practice, indeed, of some commissions shows this. This situation has been discussed in these columns before (see ELECTRIC RAILWAY JOURNAL, Feb. 11, 1922, page 223), but it should serve a good purpose to call attention to it once more. It is a matter of prime importance to utilities and also to the public.

One commissioner pointed out shortcomings in the law which forced his commission to decide questions on only a part of the considerations. Another commissioner showed how restricted regulation is incompetent to do the greatest good. Another said that the commissions were in many cases made mere magistrate courts for the purpose of making a record for appeal. What they all thought, taken together, means that commissions are still in the formative state. As courts of equity were created by a condition with which the courts of law could not adequately cope, so are commissions now being created by the condition that the public and the utility have learned that legislatures, courts of any kind, city councils, etc., could not adequately handle the character of problem presented by utility-public relations. Courts of equity needed years to grow into the position of respect and usefulness that courts of law previously held, and likewise commissions will take a certain formative period to reach the degree of perfection and respect most necessary for them to perform their functions with full effectiveness.

Commissioner Maloy was fundamentally sound when he urged a return to first principles in analyzing the commission situation. Commissions should not be confused with other institutions and they should not be forced into a procedure out of tune with the purpose of their function. Commissions can work most effectively only when they are allowed to consider all the elements of a case confronting them. Commissions will never attain their utmost of usefulness until they have been given the support of all kinds which will encourage men of high caliber, of courage, of knowledge and of ability to accept and retain commissionerships. The fundamental principle of commissions should always be held in view as the goal to aim at. This principle is that a commission should sit as a business administrative body with full consideration of the economic, social and engineering features of the cases confronting it, to decide from the facts presented what is the best move in the interests of the public. Since eventually this procedure is also in the best interest of the utility, utility men can do no more effective work than to lend every effort to the continued upbuilding of commission regulation according to fundamental sound principles. In the end this will produce the greatest stability in utility operation.

Engineering Association Did a Good Job Last Year

THE decision to issue the Engineering Manual in bound form had a stimulating effect upon Engineering Association activities during the past year. The several committees naturally desire to have the book as nearly up to date as possible along their respective lines of work. They have, therefore, delved into almost-forgotten sections of the Manual, revising many, recommending the omission of others, and adding a few. The revision committee, also, has worked faithfully on a thankless task and has done it well. The Manual will seem more authoritative, somehow, in the bound form in which it is to be issued, and it certainly will be less clumsy.

The engineers also made a creditable record in getting the results of their work promptly into the hands of the American Engineering Standards Committee. They were stimulated by the time limit, lately removed, on the acceptability of applications under the abbreviated procedure. It was gratifying that so many standards were ready to be submitted without much revision. Co-operation with other organizations, such as the American Society for Municipal Improvements and the American Society for Testing Materials, also has brought excellent results.

At the Atlantic City convention the purchasing agents and storekeepers held a profitable meeting under the auspices of the Engineering Association. This solves a difficult association problem to the entire satisfaction of the specialists concerned, as is shown by the fact that they want the arrangement continued. This meeting will be reported in next week's issue.

The past year demonstrated the benefits of the sponsor system in committee work. The close co-operation thus maintained with the executive committee resulted in official backing for all worthy projects. The plan should, and presumably will be continued.

There must be something deeply absorbing in engineering to give engineers the incentive and patience to do committee work like that which is done for the Engineering Association so faithfully. It cannot but be a grind to work out specifications item by item. Its only object is to save money for the industry.

Great Committee Activity Shown by Reports

THE great amount of work that has been done by the various committees of the American Electric Railway Association and the affiliated associations has been impressed upon the editors by the work of the last two weeks in abstracting their reports. The reports of the committees have been prepared thoroughly and conscientiously, as the results achieved indicate.

Greater efforts than usual were made by both committees and association staff to get these reports completed and printed ahead of time, with the result that practically all the important reports could be edited and printed with less of the last-minute rush than usually characterizes the pre-convention days. Not only did this assure more careful work, but it permitted those in attendance at the convention to have before them copies dealing with the principal business of the sessions with which they were concerned.

The promptness with which this material was prepared has also been of great assistance to the editors in preparing this report issue. The issue, therefore, contains an extended report of the proceedings of the American, Engineering, and Transportation & Traffic Associations, according to the usual custom. The immense amount of material to be handled necessitates that the report of the Accountants' and Claims Associations be deferred until a later issue.

This paper wants to acknowledge the assistance of the executive secretary of the association and his staff for the splendid spirit of co-operation they have shown in furnishing advance copies of committee reports and papers, which have done much to make possible an early and full presentation of the proceedings of the sessions. Without this assistance it virtually would have been impossible to give as much attention as has been done in this issue to the discussions at the sessions, as otherwise the editors would have had to devote a very much larger portion of their time during the convention to abstracting reports and addresses.

Educational Committee Getting Down to Brass Tacks

AT THE Atlantic City convention educational representatives of member companies and professional educators met with the committee on education of the American Association for a luncheon conference on the subject close to their hearts. The conference lasted throughout the afternoon, so intense was the interest. There was an insistent demand for a definite program for educational work on an electric railway property, and steps in that direction were approved. President Budd, in a brief but factful address, put the association solidly behind the committee's work. He showed how essential is the furnishing of public utility information to employees and told how this is being done on the Chicago Elevated Railways. Mr. Budd practices at home what he preaches abroad. His experience will be helpful to next year's committee.

The machinery for doing a comprehensive piece of educational work in the association has been assembled. By the next convention there should be some tangible results on a number of properties, to be reported at the second annual educational luncheon. There is no subject in which the railway manager is more interested today than in educating his promising employees.

A.E.R.A. President Sees Industry Going Forward

By C. D. Emmons
President American Electric Railway Association
President United Railways & Electric Company of Baltimore

Biggest Exhibit Bespeaks Live Industry—Public Relations Generally Improved and Essentiality of Railway Service Better Appreciated—Unfair Tax Burdens Need Adjustment—The Use to Which Railways May Put the Bus—Reasons for Opposing Municipal Ownership Stated—President Considers Year One of Progress

Bachrach

C. D. Emmons

THIS is the greatest convention the association has ever held. In the exhibit halls is the largest exhibit of electric railway equipment, materials and supplies that was ever gathered under one roof. There is every indication that this will be the largest attended convention we have ever had, and I am sure that there never was a convention when more important subjects were up for discussion, or when it was more urgent that the closest attention be paid to the addresses and discussion.

The great exhibit and the large attendance here are the best answers one could make to the occasional detractor of the electric railways, who professes to believe that they are "dead." Here are representatives of electric railways that carried approximately 15,000,000,000 passengers in the last calendar year. Here are represented investors who have put more than $5,500,000,000 into electric railway properties to serve the people of this country. Here are representatives of electric railways and manufacturing companies that give employment to 500,000 men and women. Here are represented companies that purchase every year many millions of dollars worth of coal, steel, oil, copper, lumber and an infinite number and vast quantity of manufactured products, and by their purchases make no small contribution to the prosperity of our great nation. Who dares look upon this convention and say that such a tremendous gathering represents a "dead" enterprise? None but one who has his own ends to gain at the expense of truth and fair play would be so rash.

We meet at a time when the electric railway industry is in better condition than at any moment since the World War upset the equilibrium of the country. Much progress has been made since the convention in Chicago a year ago. More will be made in the year to come, for the public has learned that the service the electric railways are rendering is indispensable to its comfort, convenience and prosperity. In some places this knowledge has not come without interruption of service, but wherever service was interrupted, the fault lay not with the railways, which sought nothing but fair treatment.

Taking the country as a whole the public now has a better understanding of the mutuality of interest between the electric railways and the people, and this improved understanding has brought about revisions of rates of fare, partial alleviation of burdensome conditions, movements for protection of established and necessary service from incursions by irresponsible competitors and, in general, has paved the way for further relief from hampering obligations that have reacted against the public good.

Much has been done, but much remains to be done before this industry shall reach its maximum efficiency and be able to give the best service. We are encouraged by what has been accomplished during the last year; we look expectantly toward the year to come, confident that it will bring greater improvements.

Uppermost in the minds of many of you are the problems that have arisen in connection with the increase in the number of automobiles. Some of you have seen your business in sparsely settled districts drop until it has no longer paid the expense of operation. For a time it seemed as if you might have to quit, and so you would, had the public not found that the electric railway is the cheapest, most reliable, most responsible transportation agency.

Interurban roads have suffered not only from unfair, parasitic bus competition, but also because of the great increase in the number of privately owned automobiles, and many an urban railway has had to face the same situation. Nevertheless, it has been proved that the place of the electric railway is secure. Wherever a test has been made, the inevitable conclusion was that business could not prosper, that manufacturers could not conveniently carry on their enterprises, that home building could not expand, that public comfort could not be advanced without the electric railway.

One of the notable demonstrations of these facts was in Saginaw. More than two years ago, because of local political agitation and a popular misconception of the cost of supplying public transportation, Saginaw refused to make a reasonable agreement with the electric railway company, with the result that street car service was suspended. Immediately a flock of jitneys of all descriptions settled in Saginaw and attempted to give service. It was not long before the public discovered that there was a vast difference between the responsible, reliable, safe service given by the electric railway and the unsafe, hit-or-miss service given by the jitneys.

Of course such service was impossible, so Saginaw tried hard for two years to get some reliable person or corporation to install a city-wide bus service on the same basis as electric railways provide service—putting up the money themselves—but no satisfactory arrangement could be made with anybody. There were unreliable propositions by the score, including one to finance a company through popular subscriptions, which flattened out when only $5,000 could be raised, but not one reliable one that voters would indorse.

The details of the Saginaw experiment have been given in the trade press, particularly in the September issue of *Aera*, and I will not attempt to review them here. But I do want to lay emphasis on the fact that after two years of inadequate, dangerous, irresponsible, unsatisfactory bus service, the people of Saginaw went to the polls and registered a tremendous majority for the return of electric railway service. They had had two years of bitter experiences with an inferior substitute, and those experiences showed them that they had been wrong in their first conclusion, and today they are awaiting the resumption of the street car service that built up their community, that increased the value of their property, that helped make their business ventures profitable and that gave them stability as a community which fly-by-night bus service never can give any community. Saginaw's experience was merely a repetition of that of the city of Bridgeport, of the city of Toledo and of Des Moines.

Unfair Tax Burdens Must Be Remedied

There are more than 12,000,000 automobiles registered in the United States. The number is likely to be greater, for the automobile fills a popular desire. However, I feel the saturation point is rapidly being reached, for there are serious problems of congestion in the large cities, the accident hazard steadily grows worse, and the situation but emphasizes the injustice of the paving obligations which many states and communities impose upon electric railways.

As you all know, the paving charge which so many of us have to meet is in fact a subsidy of automobile traffic paid by the car riders. Originating when horses hauled street cars and pounded the pavement between the rails, this charge became illogical and unjust when electricity became the motive power. The modern electric car does no damage to the pavement between the rails or outside them. The pavement is used entirely by other vehicular traffic, which causes whatever damage is done.

The report of the committee on special taxes will go into detail on this subject, and I want to recommend that you give it careful attention. It shows that 9.6 per cent of the operating revenue of railways reporting to the committee is paid to the federal, state and local governments in taxes and imposts. The taxes include special taxes for the support of schools, parks, bridges, highways, soldiers' bonuses and many other purposes; there are license fees of wide variety; many communities demand that the railways carry free of charge their policemen, firemen and other employees. In some places the United States government does not pay for the transportation of letter carriers, and we all know that it pays but a small part of the cost of carrying the mail. None of us raises objection to fair taxation, but as matters stand today we are unfairly taxed and imposed upon.

We have no quarrel with the private automobile owner and we have no quarrel with the bus except when the bus enters territory that is rightfully that of the electric railway. I say "rightfully" because the states and communities, in giving the companies the right to do business in the streets, retain to themselves the power to regulate service and control rates of fare. Having done that, the duty of the public to the railway should be obvious—the public must protect the railways in their rights, else the public itself will be the loser. I can think of no better presentation of the point I am trying to make than was made by the New Jersey Supreme Court a few weeks ago. In its decision handed down on July 18, 1923, in a case where a bus operator sought to be relieved of conditions made by the Public Utility Commission when it granted the operator a temporary permit to operate in certain communities, the court said:

"The state assumes to regulate the rates for transportation, and the character of the service rendered. Morally and legally it should protect the business of the established utility from impairment and encroachment. To do otherwise would soon create a situation where the public would be without transportation service. No capital could be obtained for an enterprise where no security was offered to the investor. Without capital there would be no transportation facilities, which, in this age, are indispensable to the transaction of business and the enjoyment of life."

In Illinois there have been two notable decisions by the Supreme Court of that state holding to much the same view. Maine and Maryland have also acted, through their commissions, to protect the established transportation systems. Courts and commissions are recognizing that the electric railways are as necessary to the communities as the water department or the fire department. Commissions are refusing to grant certificates of public necessity and convenience to petitioners who would duplicate electric railway service, and the public press is for the most part supporting them strongly.

The people have learned that freight trucking over highways is extremely damaging, not only to the highways but to the public purse, and this knowledge has brought about enactment of laws that will, when they have been perfected, put a proper share of the cost of maintaining public highways upon the vehicles that are most destructive to them.

It is also very interesting to note that the automotive industry is showing every desire to co-operate in bringing about co-ordination of electric railway and motor transportation. There was a time when the automotive industry seemed to think that the vehicles it produces could supplant the electric railways, but experience has shown them what it has shown the public as a whole, that the electric railways have a distinct field in handling mass transportation, that electric cars afford cheapest means of transportation of the masses, that such competition as trucks and buses attempt to give is ruinous, and that when buses are operated in public transportation the street railway company in each community is best equipped to operate them. So, today we find the automotive industry declaring with us that buses should be feeders or auxiliaries to electric railway service.

The United States Chamber of Commerce is at work upon a report on transportation, and through P. H. Gadsden, who is chairman of a subcommittee, the case of the electric railways is being adequately presented. I am sure that the report of the chamber will present the facts of transportation in this country in such completeness and so clearly that a long step will be taken toward the permanent stability of this all-important factor in human happiness and prosperity.

Railways Use Buses in Their Place

At our convention a year ago we adopted a report of the committee on trackless transportation in which was the following statement:

> We believe firmly that all of the transportation requirements of any community should be furnished by one agency and that that agency should be the electric railway company. It alone has the trained organization and ripe experience required for handling passenger transportation problems, and the development of any other agency for handling those problems would result in a duplication of service which could produce only a higher cost of transportation to the public. . . Hence it is our duty as public servants, charged with the responsibility for conducting highway transportation in our respective communities, to study and consider the availability of every feasible unit or method of furnishing this service.

Since that report was adopted there has been a great increase in the number of electric railway companies operating buses in connection with their rail service. More than 100 electric railway companies, ranging in size from the largest to the smallest, have invested upward of $6,000,000 in buses, and hundreds of thousands of dollars in garages and service stations and equipment. Electric railways now are operating more than 1,000 buses. Two companies alone have invested more than a million dollars in buses during the last year.

Whether the bus transportation business is profitable at present is open to argument—in some places it is and in others it is not. Where buses can be operated in densely populated districts and where the hauls are short, they can be operated profitably at street car fares, but in general transportation they can serve the public only at a higher fare. Problems connected with proper design of bodies, proper apportionment of weight on axles, proper tires and other equipment, as well as accounting systems that will make it possible to determine the real cost of operating buses, have yet to be worked out.

The important fact, from the standpoint of the public, is that the electric railways are giving the people the kind of service they demand, and are giving it on regular schedules, regardless of weather, and at the lowest possible rates of fare. That they will continue this policy is assured. The public in most communities has come to understand that the street railway companies are making every effort to provide adequate service, and that they cannot do this unless a fair deal is accorded them by the people.

A Few Comments on Detroit

This better public understanding is being reflected in the matter of rates of fare. During the last few months there has been a decided change in the attitude of politicians and agitators, and a more favorable attitude by the press. It has been due to certain developments that have demonstrated beyond all doubt the close relation between costs and fares. Perhaps the most effective demonstration has been in Detroit, to which advocates of municipal ownership have pointed rather proudly until recently. The people there were promised "the 5-cent fare," extended service, the finest equipment and payment for the property out of earnings, by the municipal ownership advocates. "No more bond issues," was another promise.

Such promises are easily made, but not easy to live up to. Were it possible for a municipality to employ labor and buy materials at lower prices than privately owned companies must pay, demagogic promises might be kept. But one cannot escape facts, and the fact in the case of Detroit is that when it became necessary to increase the wages of employees of the Department of Street Railways those in charge of the railways could turn only to the car riders for the additional money, and they increased the fare to 6 cents, plus 1 cent for a transfer. They did right, but they did nothing different from what every privately owned property has had to do in similar circumstances. In a statement made by Mr. Steffens, former city comptroller of Detroit, printed in the Detroit *Free Press* of Aug. 25, this former city official, who by the way is a municipal ownership advocate, said that "an increase to 7 cents would have been the most business-like procedure," and forecasts are made that another fare increase cannot long be delayed.

The Detroit fare raise is at such variance with the announcement of "$1,000,000 profit in the first year of operation" that the people of that city must be wondering what became of the million. Those who are not acquainted with finance assume that a "profit" is money in the bank, or, at least, money available for use. In this case the rather insubstantial "profit" was invested or pledged before the public found out that the city had it, so that now the city turns to increased fares and to another bond issue to provide a semblance of the service promises made prior to the city's taking over the railways.

WHY A. E. R. A. OPPOSES PUBLIC OWNERSHIP

In this connection I think it is timely and proper to state again the attitude of the association toward public ownership. That we are opposed to it is common knowledge, but why we are opposed to it may not be understood by the public. Our opposition is not because we fear the loss of our property —the laws of this country protect all enterprises from confiscation without payment of the full value of the property taken. Our opposition is not due to fear of loss of profits, for some of the largest railways in the country have made no profits for several years —they are devoting all their energies to service of the public without one cent of return to the stockholders. Nor is our opposition due to fear that we may lose our jobs—whether railways are privately or publicly owned there must be trained, intelligent, progressive men to operate them.

Why, then, are we, and all other business organizations, opposed to public ownership? Because, gentlemen, it is foreign to and in conflict with the fundamental principles of the American government; because it is socialistic; because it is, in nine instances out of ten, wasteful, saturated with politics and inefficiency, and because, once it is established as a principle, it means the end of the representative form of government and the beginning of socialistic government. We all know what has come of experiments in pure democracy and socialism. I am sure I am safe in saying that the intelligent people of this country will not countenance the destruction of sound government. The problem before all who would preserve a prosperous, sane nation is to demonstrate to the unthinking the falsity of demagogues who advance the socialistic cause and the ruin that lies in adoption of their nostrums.

Adding the Bus to Existing Facilities[*]

By L. S. Storrs

President the Connecticut Company
New Haven, Conn.

L. S. Storrs

Independent Operation Would Result in Survival of the Fittest, to the Detriment of the Public—How the Two Agencies Should Be Co-ordinated Is Pointed Out

The outstanding feature of this convention is the important place which the motor bus occupies. This is true not only in this meeting of the American Association and the exhibit halls but also in the meetings of the affiliated organizations. Last year a moderate exhibit was made of these facilities and some little attention was given to a discussion of the subject. The year before there were no exhibits of material interest, and the discussion of the matter was largely limited to executive session where the subject was hotly argued.

This is a natural progress. But a short time ago the motor advocates were urging that agency as the coming means of public transportation and pointing to an assumed analogy between the conditions confronting the horse cars of a short generation ago and the then newer method of propulsion, electric power, and what they claimed were the conditions of the present day between the electric car and the motor.

The essential difference between the two periods is the fact that great mass movements of people cannot be successfully conducted by the motor. A few practical demonstrations were sufficient to clear up any misconception there may have been in this line. Today we find the careful students of the transportation problem in practical agreement, that the two agencies must be co-ordinated.

Few, if any, electric railway executives will disagree with Mr. Reeves' fundamental principles that service must be co-ordinated and, in most instances, rendered by the traction utility, and that with independent operation the result would be merely the survival of the fittest, to the detriment of all concerned, the public most of all.

The problem is divided into the three classes into which the traction utility, itself, automatically falls: That of the metropolitan area, in which the main stem of the traction is the high-speed line, either subway or elevated, with distributing surface lines. The surface lines may or may not be operated by the general traction utility. The problem as to co-ordination is narrowed down to the question as to what is to the best interest of the numerous local centers as against what is of benefit to the metropolitan area as a whole.

The question of the suburban and interurban routes is entirely different from the urban problem. The highways that have been improved at the expense of the public have made possible great speed, which, coupled with the flexibility of the motor stage, has been the controlling element in the development of the competitive motor. Nor is this phase of the problem similar in different parts of the country. Climatic conditions and the relative level and open roads of the Pacific Coast make possible a form of stage operation entirely impossible in areas of more rigorous climate and hilly country.

In the cities throughout the land, the transportation problem is, necessarily, one in which the general benefit of the community as a whole must prevail, as against the particular interest of any individual or group.

It is as essential for the growth and continued development of the cities that the civic side of public transportation should outweigh all others as that the city should be properly zoned and the various functions of the city group kept within proper territorial limits. For this reason the traction utility is most distinctly monopolistic in character. Any competition that tends to restrict the proper earning capacity of the general municipal transportation utility will render that utility incapable of performing its proper function. The utility management is the only one capable of unifying all transportation service in any city, to the ultimate advantage of the entire community. When charged with the obligation of adding to the existing rail facilities the mobile motor auxiliary, this group of experts certainly can do better work and accomplish more satisfactory results than any other.

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[*] Abstract of written discussion on co-ordination of electric railway and bus operation presented before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

In the ultimate analysis "public opinion" will dictate the method of operation and the means by which this desired co-ordination is to be accomplished. Public opinion is slow to recognize the actual economic principles of a utility problem.

WHY SOME BUSES CAN CHARGE LOW FARES

The great factor that rendered possible the marked advance in urban motor transportation was the necessary increase in the rate charged for the service rendered by the electric railways. With the ability of the independent bus operator to confine his activity to the area of greatest density, the high factor of loading has enabled him, generally, to keep his rate lower than has been possible on the electric railways which must serve the entire community with a varying load factor. This, coupled with the natural public preference for the individual, as compared with corporate methods, has made it almost impossible to bring about a complete co-ordination of service in any community.

The prime essential of any plan to bring these two agencies into a common effort is recognition that this new medium, even if operated by an independent owner, is really but a single unit of many that are required to provide the transportation requirements of a community and as such must be operated where the service rendered is really necessary. Practically, the trouble with this is that the bus will then be in a part of the city which has not reached the maximum density of population, while the bus owner will prefer to operate in areas where he will obtain a constant heavy load, and where he can operate at a less rate of fare than the prevailing street car rates. The densely settled areas are always to be found along routes of public transportation which have been developed by the electric railways. Here, as always, the preference of the individual will be in conflict with the benefit of the community as a whole.

Another factor that works against the inauguration of a co-ordination of the two agencies is the reluctance of the railway executive to establish a service in an untried area, with the certainty that, once established, he must continue the service indefinitely, whereas the independent can abandon the operation if it is found to be unprofitable.

It is comparatively easy to imagine a city where the electric railway and bus operations are thoroughly co-ordinated, where the electric railway gives regular service over the rails laid as the city was growing in well defined residence, industrial and business areas, with the buses confined to areas that have grown up in recent years, and where the utility has not been able to expand due to lack of funds. But assume that in such a city the independent bus operator had been allowed to run in competition with the electric railway through the densely populated areas, unregulated and uncontrolled, and had taken so large an amount of the railway revenues that the utility rate had to be advanced above the bus rate in an effort to make the income cover the necessary outgo. What would be the public reaction to a proposal to co-ordinate the service, make the bus supplemental to the electric railway and thus give a unified service to the entire community?

Theoretically, this is the desired outcome, but I contend the matter is merely one for academic discussion up to the point that either one or the other facility faces bankruptcy, and of course it will be the utility with its obligations to render service throughout the entire city that would go.

HOW TO ESTABLISH CO-ORDINATION

This is all leading to the statement that the necessary preliminary to any effort to co-ordinate these two agencies is a public opinion that will support a legislation which recognizes that the two agencies are merely different means of providing a convenient and needed public transportation service which must be unified in order that the various communities may have a thoroughly efficient transportation service at the lowest possible rate.

In any state where the legislative acts have been changed to recognize this situation, it is a much easier task to accomplish a co-ordinated public transportation service. In such states there are places, outside of the city areas served by the transportation utility, where the independent operator should find sufficient inducement to provide service. The real co-ordination devolves upon the transportation utility, and a full measure of bus operation should be undertaken as rapidly as the need for service is apparent and funds available to provide the equipment.

Under all other conditions we can talk all we please about co-ordinating these facilities, but can accomplish nothing until the public opinion is of a temper to accept the needed regulation.

There is no question but that this competition which we have all had to contend with has provided a very valuable spur to all engaged in the transportation utility. Coming as it did at a time of advancing costs the drain caused upon our revenues by this competition made it all but impossible to continue operations free from receiverships. It has been necessary to put into effect so many economies that the entire theory and system of electric railway methods bears but little resemblance to those which were the common practice of a decade ago.

Gradually, but no less certainly, the transportation utility will adopt this newer form of vehicle for public service. Its actual place has as yet to be developed. There are, of course, many instances where its value is clearly apparent, but until each individual unit is operated so as to bring in the maximum revenue and perform a service of the greatest advantage to the public the true function of the motor bus will not be shown.

CO-ORDINATION DEFINED

There is one question that must be answered. It is essential that the definition of this term "co-ordination" be thoroughly established so that there be no misunderstanding in the future. Do all parties have the same understanding as to what is to be co-ordinated? To all careful students of public transportation the idea of competition is repugnant. This method of diverting a portion of the public charge for transportation from the agency that is constantly endeavoring to render a satisfactory service at the lowest possible cost is merely the club wielded by the public itself in an effort to obtain from the transportation agency either a lower rate or a more convenient service than it is possible to render. In the long run the public, the community as a whole, will suffer. We cannot, therefore, contemplate any so-called co-ordination that would inject an intense competition between the electric car and the bus.

Operated as an auxiliary to the rail lines, the bus can perform a most useful function in the community. Its maximum value cannot, however, be determined until after a long period of actual use and careful experiment.

There are, of course, areas in many cities that have heretofore been without any convenient public transportation, in which even the independent bus operation has not ventured, which should receive bus service. In some instances, by an abandonment of a portion of a rail route, a more serviceable route can be established by motor. At certain periods of the day temporary bus routes entirely impossible by rail can be operated, to the great convenience of a portion of the population. A continuance of service, by bus, may be possible where the cost of changes or repair of unprofitable rail lines would otherwise necessitate the complete abandonment of all service.

The public cannot escape a very distinct benefit from the present attitude of both the executives of the transportation utility and the manufacturers of the motor vehicle in the mutual efforts to find a common ground for co-ordinating all means of transportation.

Coffin Prize Awarded to Chicago, North Shore & Milwaukee R.R.

Report of Charles A. Coffin Prize Committee Presented Here in Full, with Remarks of President Emmons and Response of Messrs. Budd and Homan

THE committee takes great pleasure in reporting on the conditions and circumstances surrounding the first award in the electric railway field of the gold medal offered by the Charles A. Coffin Foundation, established by the General Electric Company in honor of the many years of service to the electrical industry of its former great president.

It will be recalled that under the conditions of the foundation it is provided that an annual award of the Charles A. Coffin Medal will be made to that electric railway company in the United States which during the year has made the greatest contribution toward increasing the advantage of electric transportation for the convenience and well-being of the public and for the benefit of the industry. It is also specified that the company receiving the medal shall receive $1,000 for its employees' benefit or a similar fund.

Every electric railway company in the United States was invited to participate and urged to send to the committee a representation of its activities and accomplishments comprised within the field of the award.

This being the first year of the contest, it would seem that a larger number of entries were not received either because the time at the disposal of the companies was too limited for a thorough presentation of the results they had obtained, or else they have not, as yet, grasped the advantages accruing not only to themselves but to others in competing for the prize.

Before taking up the details of its work the committee desires to point out to the industry what a splendid service is to be accomplished by the annual award of this prize. The committee has made a detailed study of the merits of each claim presented in the contest this year and it has been greatly impressed with their contents. It feels that if nothing else were accomplished than to bring to light before the industry the detailed accomplishments of the various companies as set forth in their petitions the result of the Coffin Foundation would be of significant value. Those companies which have responded to the invitation to compete for the prize this year have done so with a very clear conception of the opportunity afforded and have put much thought and a great deal of labor on the preparation of their report. Of course, only one company can receive the prize, but all this work of the other contestants will not be lost, for in addition to the benefits they themselves have received from doing the work of which their statements speak, the ideas and information thus made available will be helpful to the entire industry, as it will be made available through the industry's publications.

CHARLES·A·COFFIN·MEDAL·
FOR DISTINGUISHED CONTRIBUTION TO THE DEVELOPMENT OF ELECTRIC TRANSPORTATION FOR THE CONVENIENCE OF THE PUBLIC AND THE BENEFIT OF THE INDUSTRY AWARDED TO

The Charles A. Coffin Medal, Awarded for the First Time This Year.

But this is not the greatest thing accomplished by the Coffin Foundation prize. It establishes a means of giving recognition every year to that company which has made the most distinguished contribution to the development of electric railway transportation, and thereby serves to stimulate new initiative and increased endeavor toward the further development of this essential business.

For the contest this year the committee agreed upon and published eight points which would be considered the principal factors in making the award. It subsequently agreed upon the relative rating to be given each of these points in summing up the claims of the various companies. These are as follows:

1. The particular initiative, skill and enterprise manifested in popularizing electric railway service—more riders and more revenue.
2. Outstanding success in gaining public good will.
3. Economies which have been introduced in operation resulting from original ideas.
4. Economies in operation viewed as a measure of the extent to which the company has taken advantage of new developments in operating and maintenance practices and equipment originating with others.
5. Improvements in construction practice which have resulted in reduced first cost, reduced maintenance or greater reliability of service.
6. Particular success in conducting a safety program and actually reducing the number and seriousness of accidents,
7. Outstanding accomplishments in development of good relations between management and employees.
8. Special accomplishments, aside from good management, tending to reduce the cost of new capital.

Seventeen electric railway companies made submissions for the prize this year. Their statements range in size from a small brief to a large volume of matter, with numerous illustrations and various data. The committee had two meetings, with all members present, and spent considerable time in analyzing the statements and accompanying data.

As the study proceeded, it became evident that the railway represented by one of the members of the committee was one of the best three or four in the contest. This member of the committee thereafter retired from the deliberations.

In the final consideration, taking into account the relative standing of the several contestants on the basis of the weighted percentages given on the individual factors, the manner of presentation and the general importance of the subject matter of the report as a whole, there was no question as to the winner. There were two or three very close contestants for first honor, but it was perfectly clear which one held leading place and this was unanimously agreed to by the members of the committee sitting, and by the two consulting engineers who had been requested to sit in at the proceedings.

From the representations of the winning company, the committee finds that on this property there has been carried to fruition most of the things that have been talked about for years as the remedies for various troubles. On this property the remedies have not only been talked about; they have been executed. Thus the winner stands out as a railway that has largely accomplished the tasks of gaining public good will, of merchandising transportation, modernizing service and equipment, improving the financial structure, and so on. There is no one great achievement on which the committee has based its award, but rather upon the accumulated results of a great many smaller accomplishments, although the committee was greatly impressed by the particular success of the company along the lines of gaining good will and selling its service.

ACCOMPLISHMENTS OF THE WINNER

As evidence of popularizing its service, the company shows that its revenue has increased 10 per cent in a year, its carload freight business has increased 40 per cent, its merchandise freight business has increased 50 per cent. New trains were added to connect with some of the fast trunk line trains and the running time between terminals, already fast, was reduced five minutes more. New types of equipment have been added and many detail improvements looking toward greater comfort of the passengers have been worked out. Motor buses have been extensively put into service as feeders for the railway. One-man cars have been purchased and placed in operation in services for which they were adapted. Extensive advertising in the form of posters, billboards, motion pictures and exhibits has helped materially.

Among the points cited contributing particularly to success in gaining public good will are the inauguration of a half-hour limited service between two important towns where the traffic hardly warranted this, immediate attention to complaints with reply to the person making the complaint, dinners to public officials, business associations and newspaper men when anything new is inaugurated, refund of unused tickets made within five days, freight overcharges refunded promptly, often in the absence of any claim. Above all is the general policy that economies are never made at the expense of the public.

The company is on the lookout for every possible economy as evidenced by the fact that a tour of the country was made during the year by a group of its men to find new ideas from other companies which might be applied to their property. Some of the particular economies that have been effected during the year include an important reduction in power consumption resulting from the coaching of motormen, use of lighter and more efficient car equipment, a study of the proper type of equipment for various classes of service and the balancing of motors and trailers in various classes of service; more scientific schedule making and elimination of stops, especially during the peak periods, and improvement in the average line voltage which permits more coasting. This endeavor to reduce energy consumption is facilitated by the use of meters on all passenger cars which give accurate records of the energy consumption per car-mile. Notable economies in the matter of accounting are also cited in the claims. A scheme was devised which saved 40 cents per 1,000 in printing tickets. Keeping stock records of tickets under a new plan saved 50 per cent of the time required. This also was responsible for saving the time of one traveling auditor, and 75 per cent of the time of ticket agents required in making reports. The substitution of a visible file for the ledger form of ticket records resulted in 10 per cent economy and gave more accurate results. A machine for analyzing ticket sales saved the time of one and one-third clerks. The use of billing machines in two merchandise dispatch stations saved four clerks and these machines are being installed in all stations now.

Construction methods which are contributing to the general success of this company include the placing of high-tension apparatus outside the buildings in the latest substations. All new alternating-current apparatus is of 60-cycle frequency in spite of the fact that all of the long-term power contracts were made for 25-cycle energy. A program of rock ballasting the entire system is 60 per cent completed. The old light rail is being replaced with 100-lb. rail. Concrete and brick platforms are replacing wood at the stations.

In fostering greater safety in operation, the company has succeeded in reducing injury and damage claims to 1.82 per cent of the gross. The record was one accident per 16,081 car-miles in 1922. The company's safety department is given the same status in operation as the other departments. Several community safety organizations have been formed through the influence of the company's safety department. In the schools 570 lectures were made to 22,500 pupils. During the present year 152 meetings of employees, groups and committees have been held and brought out 884 recommendations, of which 707 have been carried out, looking to greater safety. A "safety first" car goes over the property for meetings of the trackmen. First-aid drill teams have also been a notable part of the company's safety work, the membership of these teams being rotated so that all employees get the instruction.

In the work of developing good employee relations, the company has had particular success in paying one-half the tuition for extension courses, in providing classes in public speaking and in employing a prominent educator for a series of lectures on public utility operation. A most commendable piece of work has been the endeavor of the company to Americanize its foreign-born employees. This has been done through education and preparation for citizenship, good recreation, etc., and it has resulted in a very low turnover in labor. A forward step has also been made in providing very much better housing conditions for track employees. Other practices contributing to good employee relations have been a systematic plan of advice, together with plans and estimates for building houses, various social activities under the direction of a company club and the maintenance of a "placement" service, the duty of which is to find the job where a man will fit.

On the matter of "special accomplishments, aside from good management, tending to reduce the cost of new capital," the company cites the fact that it has reconstructed its financial structure to provide a flexible financing plan which also results in a material reduction in the cost of financing and makes possible a proper proportionment between bonds and stocks. The company is also having success in selling its stock to customers and employees.

From this very brief summary of the particular accomplishments set forth by the winning company as its claim for the honor of receiving the Coffin Medal, some idea may be had of the considerations which led the committee to its decision. The committee therefore now takes greatest pleasure in announcing that the Charles A. Coffin Gold Medal of 1923, for outstanding contributions to the art of electric railway transportation, is hereby awarded to the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

The report was signed by James H. McGraw and C. D. Emmons, chairman.

Britton I. Budd, though a member of the committee, did not take part in the final decision, nor sign the report for reasons already given.

After reading the committee report, President Emmons called Britton I. Budd to the platform and said:

"It gives me great pleasure, Mr. Budd, to present to you the Charles A. Coffin Gold Medal for 1923. You have well earned this in the accomplishments of yourself and your organization in the operation of your great railway system. It is further a particularly happy circumstance that you are personally to receive this medal at a time when you are to assume the responsibilities of directing the destinies of the American Electric Railway Association for the coming year."

Mr. Emmons tendered the gold medal to Mr. Budd and also a certificate which he stated he knew Mr. Budd would be proud to hang up in his office.

In responding Mr. Budd stated that on behalf of his organization he wanted to express thanks for the recognition of whatever has been accomplished. He stated that whatever had been done may be attributed to teamwork on the part of all—directors, officers and all employees. They have teamed as one in the common purpose of endeavoring to give service and win good will. They have done little that is unusual or original, he stated. Practically all the discussions of the great American Electric Railway Association have simply been taken advantage of and applied to the end of producing better and more popular service.

Mr. Emmons then called Louis Homan, supervisor of bridges and buildings of the North Shore Line and president of the Employees' Mutual Benefit Association, to the platform. Addressing him, Mr. Emmons said:

"The fact that your company has secured the award of the Coffin Foundation is proof positive that the greatest spirit of co-operation must have existed between all the men concerned in the operation of your railway system. I hope that you will carry back to your associates the congratulations of the American Electric Railway Association on their achievements as railroad men which have resulted in their attaining this award."

Mr. Homan thanked the association on behalf of the 1,500 employees of the North Shore Line and stated that the gift would be greatly appreciated and would stimulate the employees to greater effort to give good service, and in this way to carry out the idea of the donor, namely, to make electric railway service more popular.

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*Industrial Relations on the Pennsylvania Railroad**

By Elisha Lee

Vice-President Eastern Region
Pennsylvania Railroad System

Elisha Lee

Employees Elect Representatives to Joint Committees, Which Have Jurisdiction Over Wages, Working Conditions and Discipline — The Plan Is Working Satisfactorily.

IT IS a pleasure to have the privilege of talking to you on the subject of industrial relations on the Pennsylvania Railroad. There is a community of interest between your industry and the steam railroads in many fundamental respects. Both are engaged in a necessary public service. For that reason, public policy as applied to both has for many years taken the form of regulation of a very special and frequently burdensome and restrictive nature. For the same reason also the regulations between employer and employees in both industries vitally concern the public itself and assume an importance that is peculiar to transportation as an industry altogether necessary to the life and prosperity of the people.

Before describing our plan and its operation in detail, I should like to say something that is perhaps of a general nature but which is nevertheless fundamental to a proper realization of what we are doing. Few questions have received as much public consideration in recent years as this so-called problem of industrial relations. We have had two President's conferences on the subject. The churches have taken it up through social service agencies whose commissions are actively engaged in studying its various phases. Other organizations have been contributing liberally to the discussion. We have whole books on labor terminology alone and a veritable mass of literature, reports, studies and investigations as to how employer and employee shall live together.

Unfortunately, too, there are many studying and writing and talking about the labor problem who seem to be unwilling or unable to see any middle ground between the national unionism of Mr. Gompers and the attitude of the employer who says in effect, "You cannot organize at all. I shall run my business as I please." Both are wrong. In this respect employee representation has been derided as an attempt to bust up the unions and to frustrate organization. On the Pennsylvania it is neither. Many of the employee representatives with whom our relations are most cordial and friendly are members and officers of some of the strongest labor unions in the United States. We are dealing with 100 per cent union committees representing the signalmen, and the men in engine and train service.

In any industry the personal interest of its workers is necessary to its efficient operation. It is the height of misguided folly for any man who calls himself a labor leader to encourage the thought that an employee's allegiance as a worker belongs to someone who stands over his employer with the weapon of the closed shop, the sympathetic strike and restriction of output. We have outgrown Prussianism in labor relations just as we have outgrown it in international relations.

It is our feeling on the Pennsylvania that we have found a way of solving this problem not only to the satisfaction of our officers and employees but to the satisfaction of the shippers, the farmers and the business men in the territory served by the Pennsylvania Railroad. Of course there has been criticism, some of it, as many of you know, from sources which should have given us the greatest encouragement. The answer to most of it, however, is obvious. There are 240,000 officers and employees on our railroad. You cannot humbug 240,000 intelligent men and get away with it.

Naturally skepticism met our proposals when we undertook to work out a plan of co-operation with our employees. Certain labor organizations falsely alleged that we were engaging in an anti-union crusade. Many of our employees, while not openly opposing the plan, had little faith in it and did not take it seriously. Today the vast majority are convinced, after the test of time has proved the worth of our plan, that this plan is on the level.

Some confusion, perhaps, was caused in the minds of many persons outside the railroad by the controversy between the Pennsylvania Railroad and the Labor Board, but I believe that it has now been dissipated to a large extent and that more and more the success of our joint efforts is becoming recognized and appreciated.

BASIS OF PLAN

Essentially the Pennsylvania plan is very simple. We start out in the belief that both officers and employees are honest and sincere; that we are really friends and partners in the business; that we have the same stake in the success and prosperity of our railroad; that the real measure of our mutual success is satisfactory service, and that when reasonable men sit down around a table to talk over their differences in friendly fashion, they will come to a satisfactory understanding.

Our plan presupposes peace. It has been established to maintain peace. It is not an armed neutrality, nor does it embody a code of rules for carrying on a constant row. The success of our plan demands mutual trust. We get our facts straight and then we proceed to act on them in joint conferences at which we are all equals.

The first step in formulating the present plan of employee representation was taken with the representatives of engine and train service employees on Dec. 29, 1920, when the "Memorandum of Understanding" with those employees was adopted, effective Jan. 1, 1921. This document provided for an orderly procedure for handling all controversial matters between the men of this service and the management. It provided for regular monthly meetings between the employees' committees and the superintendents, general superintendents and the four general managers.

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

But more important than this was the provision for a joint tribunal of men and management, known as the joint reviewing committee, with plenary power in the settlement of disputes referred to it. The decisions of this body, reached by a two-thirds vote of the individuals composing it, are, so far as the management is concerned, final and not subject to veto or appeal.

Following the issuance of Decision No. 119 of the United States Railroad Labor Board, providing for termination of the national agreements, agreements were made with all other classes of our employees covering this method of handling controversial matters.

As it was impossible to meet the employees individually or en masse, we asked them to vote by secret ballot for employee representatives on each division, in the shops, in the freight houses, and in all classes of the service. The only limitation placed upon them was that the representatives must be employees. Membership or non-membership in any organization does not concern us. As a matter of fact the representatives selected in several classes are all union members and, as I have already pointed out, we have had for many years most cordial relations with our train and engine service representatives, all of whom are union members.

The structure of our plan is very simple. All the employees in a particular class and at stated times elect employee representatives. Local committees are formed on each division and in the shops. General committees are chosen to deal with the general superintendents and general managers. Meetings with division and general division superintendents and general managers are held at fixed times, so that there can be no delay or evasion in the consideration of disputed questions, or discussion of problems of the management and of the men.

The keystone of our whole plan is the joint committee for each class of employees, which is the highest authority on the railroad in the determination of any questions affecting wages, working conditions, discipline and discharge of employees. These committees are composed of an equal number of representatives of the employees and the management. Two-thirds vote is necessary to decide any question. If the committee cannot agree by at least two-thirds vote, the committee itself decides how the matter shall be settled. No executive officer of the company nor even the board of directors has veto power over the joint committee's decisions.

Since these committees have been working in the last two and a half years, only two cases have arisen on which the reviewing committee was unable to reach a settlement itself. One of these cases was referred to three arbitrators, one representing the employees, one the management and the third an outsider, chosen by those two. In the other case, a representative of the management and a representative of the employees were named to inquire into the facts. In both instances the findings were accepted by the reviewing committee and adopted as the basis of its own findings.

In this connection let me say, however, that our plan of employee representation does not start and stop with the settlement of grievances. That is only one phase of it. It is important, of course, in the current operation of the railroad, but there is another phase that is of much greater significance. I refer to what might be called the constructive side—the increasing interest of employees in the problems of management in helping to bring about greater efficiency and greater production, and in eliminating waste. It works in several ways.

In the first place, because machinery is provided for the prompt settlement of an employee's grievance, he can put all his mind on his work knowing that his case is going forward and that he will get a final decision in a reasonable length of time. He becomes a more contented and therefore a better workman.

In the second place, the representatives of the employees in their monthly meetings are getting closer to the management, getting a better understanding of what it means to operate a railroad, taking a broader interest in the everyday problems of operation and actually helping to solve them.

CRITICAL TEST OF METHOD

It is possible to apply several critical tests of the methods which have been jointly worked out and agreed upon between our officers and employees—tests which no reasonable man can afford to ignore.

Is it fair to the employees themselves?

There is abundant evidence on that score. The results of the elections recently held for shop craft representatives, where more than 85 per cent of eligible employees voted, show how widespread and genuine is their satisfaction with the plan in both theory and practice. Our men have a more influential voice in determining matters affecting them than the employees of any other industry that I know about. Their wages and working conditions compare favorably with those on other railroads and in outside industries. As a matter-of-fact, the data about wages and cost of living in outside industries which is taken into account in determining wage schedules on our road is jointly collected, jointly compiled and jointly discussed and applied.

Every man has the same right of franchise in electing representatives. Employees and management have equal votes in reaching final decisions. Hearings of grievances are prompt, settlement is expeditious and certain, evasion on the part of either side is impossible, fair play is assured. Settlement of questions locally is becoming more general. Officers and employees have come closer together. They are seeing things as they look to the other fellow. We talk the same language.

Is it fair to the company?

I do not think it is necessary to argue the point that when men and management understand each other's problems, when they see and realize their mutual interest in the success of their joint enterprise and work whole-heartedly toward a common end, that enterprise itself is bound to progress.

Is it fair to the public?

The record is eloquent on this point. It goes back to the shopmen's strike of 1922 when two-thirds of the P.R.R. shopmen remained on the job and the company was enabled to handle more than its ordinary share of the country's business and serve the public without interruption while other railroads were seriously affected.

In addition, let me cite you briefly some of the accomplishments of the P.R.R. during the first eight months of this year. So much progress was made in the shops and on the road, in repairs and operations that long before Oct. 1, the goal of all the railroads of the country, the Pennsylvania Railroad had more than 87 per cent of its locomotives and 95 per cent of its freight cars in good repair, available for service.

Average carloads were increased, car movement was speeded up, carrying capacity of coal cars increased so that on Sept. 1 the improvement and betterment of service and facilities were equal to the addition of 50,000 new freight cars and about 550 new locomotives to our equipment.

At the same time this period saw the greatest volume of business in our history handled with a minimum of delay or inconvenience. From Jan. 1 to Sept. 22, the Pennsylvania Railroad handled about 20 per cent more loaded revenue freight cars than in the same period of 1922, 38 per cent more than in 1921, and 14 per cent more than in 1920, the previous record year.

Our plan may not be perfect and it may not fit other industries or railroads, but it is working and so far as we can find out is working successfully.

We do not feel that we have a finished product, or that we can now sit back and let things ride. Human nature is not built that way. The real test of what we are doing is sincerity and it is necessary in a large organization like ours, with its complex relations, to be everlastingly at it. Ours is a give and take proposition and lasting success requires that everyone right down the line, officers as well as employees, shall live up to the spirit of our relationship in all his dealings.

Essential Operating Costs[*]

By F. W. Doolittle
Vice-President North American Company, New York

Speaker Contends that Narrow Margin Between Receipts and Expenditures Does Not Allow Adequate Return on Investment—Average Fares Now One-Half Cent Too Low

F. W. Doolittle

THE extremely narrow margin between revenues and expenses has focused the attention of the electric railway industry on every item of expenditure. The records are full of instances in which the anemic dollar of the day has been helped to do the work of its more vigorous forerunner. Every month patience and skill devise new and improved methods.

After all these efforts to pit skill and genius against the problem of vanishing net, the operator must face the task of securing labor, materials, and capital in a highly competitive market where further economies are a matter not of what he can or would like to pay, but of what other lines of business can afford to pay. Nor are these the only items beyond the immediate control of the operator. There are taxes of various forms, and burdens imposed by the community as to standards of service and of equipment which, equitable or unequitable, add to the cost of the service.

What are the costs of service, and to what extent can they be lessened by changing the conditions under which service is rendered?

It is not my purpose to compare the costs in one city with those in another, hoping by such a comparison to disclose the methods of operation and management and the conditions likely to result in minimum costs. It would serve as well and be vastly easier merely to advise the industry to recruit its personnel in China, its capital in that country which the census shows to have the lowest interest rate, to pay its taxes in the islands of the sea, to purchase its power of Sir Adam, and to develop the density of traffic of the Interborough.

What we are here concerned with is rather an analysis of the types of expenditures made by the industry, with only such emphasis on their relative amount as is of use in measuring the effect of changed conditions on the cost of service.

CLASSIFICATION OF COSTS

The costs borne by electric railways may be classified briefly for this purpose as wages, materials, sundry services, contributions to cost of government, retirement insurance, cost of capital. Many factors combine to vary the relative amounts of these costs, the price level in the community served, the density of traffic and the burden of general and special taxes being of particular importance. A fair measure of the relative importance of the several classes of costs based on conditions obtaining for the industry as a whole is:

	Per Cent of Operating Revenue
Wages	41
Materials	14
Sundry services	7
Taxes, including imposts	10
Depreciation	8
Cost of capital	20

DEPRECIATION AND COST OF CAPITAL

This last item, showing 20 per cent of operating revenue for costs of capital, means 6 per cent on an investment not more than three and one-third times annual revenues, and 7½ per cent only when the investment is two and two-thirds times annual revenues. The fact is that a ratio of $4 of investment to $1 of revenue is more common. These items are, of course, not all mutually exclusive. The item "Materials," for instance, includes a very substantial amount of wage; and probably half of the 10 per cent shown for taxes represents wages and materials expended in connection with the construction and maintenance of paving, the cleaning and policing of streets, the transportation of police and firemen, and other similar items included as a part of the general tax burden but not represented by specific tax levies.

Of the total cost, 28 per cent appears as depreciation and cost of capital. The industry is not now earning, and has not for many years, if ever, been earning the full measure of these costs. At the present time such figures as are available lead to the conclusion that about three-fourths of the amounts necessary properly to cover these items are being earned, i.e., the present average fare of about 7 cents provides only a little more than 2 per cent of the cost of the property for depreciation, and a little less than 6 per cent on the investment to cover the cost of capital. That is, the fare fails by at least half a cent to cover the full cost of the service.

Here and elsewhere in these remarks averages of costs and fares are used for illustrative purposes, and these averages probably fairly reflect existing conditions. Of course, the conclusion is not warranted that because the fares charged by a particular company are above the average its net earnings are also above the average. Costs of operation depend upon many factors and cannot be measured or compared on any single unit basis.

Depreciation and cost of capital are measured in terms of investment in this discussion. The actual figures show that about 2 per cent for depreciation and 5¾ per cent for return have been earned, and these percentages would, of course, be very substantially reduced if values were made to reflect present-day prices. It is not appropriate to interject at this time a discussion of the theories of valuation, but certainly it is of interest to note the distribution of its income made by electric railways when measured in terms of the average fare of 7 cents. Out of this wages absorb by far the largest single amount, being nearly three times as great as the cost of capital.

In order that all essential costs may be met a half cent should be added to the average 7-cent fare, as shown in the following summary:

	Cents
Wages	3.09
Materials	1.05
Sundry services	.53
Taxes, including imposts	.75
Depreciation	.60
Cost of capital	1.51
Total	7.53

Under the existing 7-cent fare the amounts available for depreciation and cost of capital are substantially less than true costs, amounting respectively to but 0.45 cent and 1.13 cents.

In the fall of 1920 labor and materials had increased 136 per cent and fares 42 per cent above these figures for 1913. A year later fares reached their maximum, with an increase of 49 per cent over pre-war levels, while labor and materials had declined somewhat, but still showed an increase twice as great as fares, standing at 99 per cent. At the present time the disparity is greater than it was two years ago—being 43 per cent for fares and 103 per cent for labor and materials.

POSSIBILITIES OF REDUCING COSTS

It is of interest to consider the possibilities of lowering fares by reducing the cost of service. The average wage paid is now very close to 60 cents per hour, and is more than twice the rate paid in 1913.

If the street railway operators could persuade their employees to work for 30 cents an hour the cost of service could be reduced by 1½ cents per passenger. It requires no extended argument to prove the futility of such an attempt. Employees are recruited in the open market in competition with other industries. Wage scales generally average twice those in effect before the World War, and what is more, they have during the past year been increasing, not decreasing.

If we could go back immediately to pre-war prices paid for materials it would permit the fare to be reduced by but half a cent. Material prices, it is true, have declined a third from the high point of two and one-half times 1914 levels, but prices this past summer have averaged more than 10 per cent above those current two years ago.

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[*] Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

The items of sundry services and taxes, amounting to 1¾ cents per fare, present not only the difficulties which would be experienced in attempting to reduce wages and the cost of materials to pre-war levels, but also the difficulty arising from the tendency of taxes to increase because of the widening spheres of governmental activity.

TREATMENT OF TAXATION

Taxation is in its very nature highly complex. The natural complexity of the problem has been increased by cross purposes and lack of scientific procedure on the part of those charged with the duty of spreading the tax burden. It has become impossible to distinguish the underlying principles, unless it be opportunism. It is perfectly apparent that the various branches of the government extend their activities, and as costs of all sorts increase the number of dollars which must be collected as taxes must increase in like proportion. The device of the indirect tax has undoubtedly contributed to a growth in governmental activities which never would have been tolerated had each individual been clearly aware of the amount which he himself was contributing. Whether or not the electric railways as a whole are required to pay into the public treasuries more than their just proportion of the public burden cannot be stated positively. Certainly it is the duty of the industry to its patrons to examine carefully into this question in order that it may resist being made a collector of excessive taxes and avoid passing on an improper burden to the users of its services.

The following facts are pertinent. Of the amount available to all the electric railways operating in one important state in the year 1909, for taxes and return on investment, one-eighth was paid in taxes levied directly and seven-eighths was available to cover the cost of capital. In 1921 one-third of the amount available went for taxes and two-thirds to return on capital. Actually during this period taxes more than doubled, while the amount available for return decreased. All of the other utilities in the state, including electric, gas, telephone, heating and water, taken together, paid 10 per cent of the amount available to the government as taxes in 1909. In 1921 they paid less than 19 per cent. It would appear that equalization within the public utility group is faulty if more than 32 per cent of the net of electric railways is taken in taxes and less than 19 per cent of the net of all other utilities.

In addition to these taxes directly levied, there are, of course, large amounts collected in the form of services, such as free transportation of police and firemen, paving construction and maintenance, and other items substantial in amount but difficult to value accurately. Taxes and imposts add at least three-quarters of a cent to the average fare. Their reduction or elimination is largely beyond the control of the industry, and recent experience indicates that no relief as to this burden on the car riders can be expected until they sense its injustice and act.

Those who place property at the disposal of others can, of course, do so without charge if they so desire, but if the property is to serve permanently and if capital for additional property is to be secured it is essential that the charge for service contain two components: one a return on the value of the property consistent with returns available in other enterprises in the highly competitive market for capital, and the other an amount which will permit units no longer useful to be retired. The basis of calculating this amount, usually referred to as depreciation, has been and still is the subject of much discussion. Without attempting to review the divergent opinions, one theory will be stated for the purpose of directing attention to a cost which may be essential under certain conditions. This theory holds that value as a basis for rates is investment; that amounts collected for retirement purposes and not disbursed to the owners in liquidation of investment are in effect prepaid accounts on the part of patrons and as such are entitled to receive interest credits operating either as additional revenues or lessened expenses.

TREATMENT OF DEPRECIATION

Those who grant the equity in theory of this procedure may still question it in practice on the ground that a property is never entirely renewed at one time, that consequently the reserve is never all drawn down, and the minimum balance is therefore an amount necessary only in theory, and in fact not an essential cost.

So long as the property remains in private ownership there is force in this contention. However, it is the undoubted right of the city, state and nation to acquire public utility property, whatever may be the advisability of such action, and acquisition, we may, expect will be made as cheaply as possible. There is sufficient precedent for deducting accrued depreciation in fixing the price to make it unsafe to ignore this possibility. If the purchase price is so fixed the owner will sustain a material loss unless there has been collected from the users of the service an amount equal to the amount the property is marked down, and he cannot protect himself by the claim that the property will never be entirely renewed at one time. For example, a property costing $50,000,000 may have lived 40 per cent of its useful life and be taken for the public at $30,000,000. If it has been estimated that the property will never be put in better than 85 per cent condition and that, therefore, the reserve accrued against retirement need never be within 15 per cent, or $7,500,000, of the accrued depreciation, there will be available to the owners to offset the mark down in price only $12,500,000 instead of the $20,000,000 necessary to make the investor whole. Unless those who advocate limiting the reserve to a sort of equalizing fund can guarantee that public acquisition will be on a basis consistent with the limited reserve such a hazard exists and protection against it is an essential cost.

SLOWNESS OF TURNOVER

Ten years ago the average ratio between investment and annual revenue was probably 5 to 1. Since then revenues have increased substantially though less rapidly than operating expenses, while investment has changed much more slowly. As a result the ratio of investment to annual revenues has declined, without, however, showing a similar change with respect to net earnings. In spite of the improvement in investment ratio the turnover of capital is still so much slower than in industry as a whole, and even than in other utilities as to sharply differentiate electric railways. For example, as shown by Bliss, twenty-four industries represented by ninety-four companies averaged, during the six years 1916 to 1921, an investment of only $1.16 per dollar of annual revenue. Four of these industries had annual revenues in excess of assets.

Because of the slow turnover in the electric railway business at least 40 per cent must be added to the other costs of operation to cover depreciation and cost of capital, an essential cost perhaps not readily appreciated by the users of the service whose business experience is along other lines. There is another aspect of this situation that should be referred to and that is the cost of money to electric railways as compared with the going rate in the open market. In common with other privately owned industry, electric railways have felt the severe and in many ways unfair competition of tax-exempt securities. In addition to this adverse factor the narrow margin between revenues and expenses has been reflected in the cost of capital. An electric railway receivership in any city in the country adds to the cost of service in every other city.

RELATION OF TRAFFIC TO COSTS

In the transportation business a surprisingly large part of the costs go on from day to day without particular relation to the volume of traffic handled. An analysis of the expenditures of typical electric railways indicates that almost 50 per cent of their costs are independent of traffic. These statements refer, of course, to variations from the normal amount of traffic for which a property was constructed, and apply more particularly to decreases in the volume of traffic. A decrease in traffic of 20 per cent results in an increase in cost per passenger of 12½ per cent. Compare this with the bituminous coal industry, itself a business of large fixed costs, when a decrease in output of 20 per cent is accompanied by an increase in cost per ton of but 5 per cent.

Referring to the cost of approximately 7½ cents per passenger, of which, however, only about 7 cents is being collected, it is of particular interest to note that a 10 per cent decrease in the volume of traffic increases the cost per passenger nearly half a cent. In the period from August, 1920, which was by no means the peak of street railway business in this country, to August, 1921, there was a 10 per cent falling off in the volume of business handled by electric railways. Due to the very large percentage of fixed costs this decline in traffic alone produced approximately half a cent per passenger increase in costs. Other things being equal, an increase in business from the low point back to the 1920 level would be accompanied by a decline in the cost per passenger, but a further increase would be accompanied by relatively small further decrease in cost because of the necessary additions to plant to carry the increased business.

Is that part of the fare representing the increased cost due to lessened volume of business an essential operating cost? From the standpoint of the railways it is, of course, essential, but from the standpoint of the use of the service it is not, and can be avoided by discouraging competitive comers.

CONCLUSIONS

From this hasty survey of the essential costs of the electric railway industry the following conclusions may be drawn:

The electric railway is not now earning and has not for years, if ever, earned a return on the capital invested commensurate with the risks of the business and the opportunities in other lines. In 1913 the average fare was too low by 0.15 cent. It is now too low by 0.53 cent. If value is based on present prices failure to earn proper returns is and has been much greater.

Disregarding the present failure of fares to yield a proper return, the possibility of going back to the pre-war basis of the 5-cent fare is as remote, apparently, as is the possibility of returning to the $5 pair of shoes, the 5-cent cigar, or the 1-cent newspaper, and largely for the same reasons.

To cut 2 cents from the present fare would require that wages be reduced to an average of 20 cents an hour. If all materials and supplies cost nothing and if all taxes are remitted it would scarcely serve to cut 2 cents from the average fare. If nothing whatever were earned as a return on the investment it would still leave the average fare a trifle more than 6 cents. A larger volume of traffic would help substantially, but with the tendency of communities to divide their business, with the tendency of wages to increase, with stable prices for materials and a constant increase in the tax burdens, and with constant demands for increase in quality of service to be rendered for a single fare, the average company cannot for many years hope to make any substantial reduction in the rate of fare which should be charged.

*Co-ordination of Trolley and Bus in California**

By D. W. Pontius

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D. W. Pontius

Material Progress Has Been Made Since the Paper Read Last Year—Agreements Have Been Reached in Several Municipalities, Keeping Railway in Control of Transportation Situation

IT WOULD seem pertinent that at this time I continue the subject of "Trackless Transportation" on which I addressed the association at Chicago last year, and supplement the remarks I made at that time with a review of the present situation, and relating the progress made in trackless transportation in southern California.

Last year the estimate was that there were 380 buses and trucks operated directly in competition with the Pacific Electric, with an annual operating revenue of approximately $3,325,000. At this time, a close estimate is that there are 396 competitive buses and trucks with an annual revenue of approximately $3,750,000.

The number of operating bus companies has not increased and, through constant vigilance and protesting of applications for permits before the State Railroad Commission, no new applications of a paralleling or competitive nature have been granted during the past two years.

The increase in bus and truck revenue of competitive lines is attributed to the continued phenomenal growth of southern California in population. Better to illustrate this growth, the population of Los Angeles in 1920 was 576,000; in 1921 was 611,000, in 1922 was 722,000 and in 1923 is 987,000.

In the city of Long Beach, where two bus companies with seventy-seven buses were operating on a 5-cent fare, the situation is unchanged and we cannot justly complain, as they are not permitted to parallel the Pacific Electric lines.

In Pasadena, a year ago, we were facing not only the problem of track renewals to cost in excess of $750,000, but had directly paralleling bus competition, with not enough traffic to justify two classes of transportation on the same streets. The railway company stood ready to make the necessary expenditures, but because of the political situation the city authorities felt that the people would not approve of ruling out the paralleling bus service over the same streets where car lines were operated.

The Chamber of Commerce of the city and one of the prominent newspapers backed the bond issue and the City Board of Directors, while another leading newspaper, and an organization of Pasadena business men, bitterly fought the bond issue and favored the railway company establishing bus lines to be operated in conjunction with the street car lines.

After many unsuccessful conferences with the City Board of Directors of Pasadena, the city discontinued negotiations with the railway company and called an election for a bond issue for the purpose of installing a municipal bus system, which resulted in a spirited contest at the polls. The result of the election was the defeat of the municipal bus project by an almost two-to-one vote.

Shortly after the election, negotiations were again resumed between the city and the railway company, resulting in a very satisfactory agreement. Paralleling bus competition within the city has been entirely eliminated. Under the agreement with the city, the established cash fare is 6 cents, or ten tickets may be purchased for 50 cents, good within the local limits of the city, with transfers to or from cars within the prescribed local limits. This is with the understanding that if, after one year, it is found that the local service in Pasadena is not paying its way, the railway company may submit the matter to the Railroad Commission for an increase in fares, and if the city so desires, at the end of one year, it may submit the matter to the Railroad Commission with a view of having the fares reduced.

The equipment and street car tracks in Pasadena have been rehabilitated, and all will soon be in absolutely first-class condition. On Los Robles Avenue, where it was necessary to rebuild the tracks at a cost of approximately $350,000, if the line was to be continued, street car service has been discontinued temporarily, and bus service has been installed. Indications are that the bus service will remain permanently, as the travel on this line is not exceptionally heavy.

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

A very satisfactory street car service, augmented by bus service, is now being given, and everyone seems satisfied. At this time we are operating forty-five buses, and, with shops and garage headquarters, have a total investment in trackless transportation in the city of Pasadena of approximately $500,000.

In the Santa Monica Bay district, referred to last year, we offered to install supplemental bus service, but our offer was rejected by the City Commissioners; one commissioner favoring our plan and two opposing it. In that city a bus company was formed by some of the men who were individually operating local buses. The service rendered is anything but satisfactory to the people of that district, and the bus operators are not complying with their franchise requirements. It remains to be seen what the final solution of the transportation problem in that district will be.

SPIRITED CONTEST IN LOS ANGELES

Probably the hardest battle ever sustained by electric transportation companies to retain their right to serve a city, to repel an alien interest, and to protect itself from unwarranted and unfair competition, was made in Los Angeles recently, culminating in an election wherein the people were to decide whether the existing railways—the Los Angeles Railway and the Pacific Electric Railway—were to be permitted adequately to serve their transportation needs, or a franchise was to be given the People's Motorbus Company to establish bus lines.

The bulwark of the People's Motorbus Company in its fight for place was the use of the names of William Gibbs McAdoo, of national political fame, and Marco H. Hellman, a local banker of known great wealth, in an effort to add substantial prestige and persuasive publicity to the venture.

The franchise for the bus line being applied for by referendum petition forced the city to call an election to determine the matter, notwithstanding that the railways made application for the operation of bus service in certain districts of Los Angeles eighteen months previously, on which applications the city had never acted.

The franchise applied for was directly to parallel the street car lines on the same streets, and skim off the cream of traffic, and not to develop any new territory. The result of the election was the defeat of the People's Motorbus Company franchise by over 12,000 votes out of 86,000 cast, despite the admitted expenditure of $125,000 by Messrs. McAdoo and Hellman and their associates in carrying on their part of the campaign.

Had the McAdoo-Hellman proposition come to a vote within a short time after it first was submitted to the people, every indication was that the vote would have been against the two railways. But a campaign of education was carried on through the newspapers. Pamphlets were distributed from house to house under the direction of an organization of business men of Los Angeles and the railway companies. Officers of the two railway companies appeared before clubs and civic organizations, not only alone, but in debate with the McAdoo-Hellman representatives. Mr. McAdoo himself took the platform. Before election day the voters were well posted on the situation and gave us the assurance that invested capital in the electric railways in Los Angeles was entitled to a square deal—and we got it.

A crosstown bus line on Western Avenue is now in operation, extending through a portion of Hollywood, on the north, and across the western portion of Los Angeles, to Slauson Avenue, on the south, a distance of 11 miles. A second bus line will be established within the next thirty days over Sunset Boulevard, Vermont Avenue and Eighth Street, between Hollywood and the business district of Los Angeles, a distance of 10 miles. A third line will be established over Vermont Avenue and Eighth Street between the northern part of Hollywood and the business district of Los Angeles, a distance of 6 miles. These three lines will require a total of approximately seventy buses.

The fare directly in the Hollywood district is 6 cents, while the through bus fare over the routes named is 10 cents, carrying with this fare the privilege of transferring to the street car lines or either the Pacific Electric Railway or the Los Angeles Railway.

My prediction is that within another year the Los Angeles and Pacific Electric Railways, through the Los Angeles Motorbus Company, will be operating in Los Angeles more than 100 buses, and will have an investment in trackless transportation in the city of more than $1,000,000.

In addition to the bus service installed in the city of Pasadena and in Los Angeles the Pacific Electric is now operating feeder or auxiliary bus lines, as a part of its railway system, in the cities of Santa Ana, Alhambra, Beverly Hills, Glendale, San Bernardino and Redlands, and within the next six months we shall have in operation fifty buses as feeders to our interurban system.

In a great many instances the bus lines are being operated at a slight loss, taking into consideration operating expenses, interest, depreciation and taxes; however, the loss should not be looked upon as a serious matter for the reason that the bus service has been installed to take care of the growing traffic in districts not served, instead of extending electric lines.

STATE LEGISLATION

The last Legislature of the state of California not only passed many regulatory measures concerning bus lines, but adopted an entirely new method of licensing and taxing them. One of the most notable features was the elimination of the direct car tax upon a horsepower basis, substituting therefor a nominal license charge, and imposing a tax of 2 cents a gallon on gasoline, with a view to raising additional revenue for the road fund. It is estimated that the gasoline tax, which covers all automobiles, buses and trucks, will produce a revenue of $12,000,000 annually. This, added to the license fee of approximately $3,000,000, makes a total of $15,000,000, an increase over the previous year of approximately $6,000,000.

In the application of the new laws relative to trucks, a maximum weight has been fixed at 22,000 lb. The weight allowed in any specific case, however, is variable, depending upon whether machines are equipped with solid or pneumatic tires; solid tires being penalized by an additional charge and decrease of weight load. Another important feature is the regulation of truck speed, determined by weight of load and class of tire equipment. Buses and trucks operating in common-carrier service under the new law are required to pay to the state 4 per cent of their gross revenue.

Automobile common carriers and school buses are now required by law to stop at all grade crossings except within the limits of incorporated cities, and a number of other features beneficial to the railways and decidedly in public interest are embodied in the enactment.

The bill was bitterly contested before the Legislature by the motor bus representatives. The railways took the stand that reasonable regulation of buses and trucks operated in common-carrier service is desirable, and that the railways also operating buses were willing to pay the taxes the new law provided. While the bill is not all that could be desired, it is a long step in the right direction.

RAILWAY EXTENSIONS

The management of the Pacific Electric still has confidence in the success of the electric railways. It will be only a short time until an expenditure of $4,500,000 will be under way, building a subway for taking interurban and suburban trains off the congested streets in Los Angeles.

During the past year only two rail line extensions of importance were made, one in the city of Long Beach and the other, known as the Alhambra-San Gabriel extension, in the San Gabriel Valley, which is destined to open up quite a large territory for subdivision and home extension, representing an expenditure of $288,000. Passenger and freight equipment has been purchased during the past year to the extent of $6,000,000, and a large portion has already been delivered.

I am pleased to say that the Pacific Electric has made a better showing during the past year than at any time since placed in operation and is now financially making its way.

Our relations with the public generally, throughout the territory served, are most cordial. During the past two years there has been a growing spirit of fairness toward the railways, and it is expected that by keeping faith with the public and making a sincere endeavor to serve adequately and treat courteously our patrons, we will retain and enjoy their good will. Their attitude is best reflected in their actions at the polls in Pasadena and Los Angeles, at a time when the interests of the electric railways were being jeopardized.

The management of the Pacific Electric has confidence in the future and has definitely entered the motor bus field, or more properly speaking, the motor bus has been adopted as a factor in Pacific Electric Railway operation for use on auxiliary and feeder lines.

I do not concede that buses can take the place of the electric railways, but because of their adaptation as feeders and auxiliaries to main or trunk lines, they have proved their usefulness in connection with such transportation.

As I stated last year, the problem of the electric railways is not to put the buses and trucks out of business but to see that they are used in districts not adequately served by rail transportation. If the railways expect to hold the business in their territories they must either extend their lines or install supplemental bus service to take care of traffic requirements, or face destructive competition.

Buses are not practical for the handling of mass traffic, and the two electric railways operating in Los Angeles and vicinity are more needed today than at any time during the past.

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*Industrial Standardization Urged**

By ***P. G. Agnew***

Secretary
American Engineering Standards Committee

Much Progress Has Been Made by Co-operation of National Societies and the Industries Generally—International Co-operation Is the Next Step

P. G. Agnew

THE United States is justly regarded as the home of mass production and of interchangeable parts manufacture. The extensive development of standardization activities by engineering societies and by trade associations have taken place almost wholly within the last quarter century. At the present time there are literally hundreds of such organizations engaged in standardization activities in some form.

As examples there may be mentioned the extensive lists of specifications and dimensional standards of the American Electric Railway Association; the great group of purchase specifications and methods of testing for a large number of materials, which have been formulated by the American Society for Testing Materials; the dimensional standards for parts and supplies for automobiles, developed by the Society of Automotive Engineers; the large amount of dimensional standardization and specification work carried out by the railroads; and the standardization rules of the American Institute of Electrical Engineers.

In many cases, standards so developed have come into such general use as to make them essentially national in character. In far more numerous cases, such standards are receiving increasing recognition, but systematic co-operation and understandings with other interested bodies will be necessary to make possible full national recognition.

The American Engineering Standards Committee, whose organization came about as a result of the large number of bodies, technical, industrial, and governmental, doing industrial standardization work, is the agency through which such work in this country is passing from standardization by associations, societies, and governmental agencies to standardization on a national scale. Through its methods and procedure, which are the result of extensive study and discussion on the part of the numerous bodies concerned, and which have been further developed by four years of experience in active work, the standardization work of the many bodies concerned is being broadened and unified into national industrial standards.

From the first the work has grown steadily and rapidly. To one who has not been in close touch, the extent to which it has reached out into various industries and drawn in organizations, industrial, technical, and governmental, is astonishing. Work has been done on more than 150 standardization projects. Of these forty have been completed. More than 200 national organizations are participating in the various projects through their accredited representatives. These include more than 1,000 different individuals.

A systematic plan of co-operation has been adopted by which all organizations interested in any particular standardization project participate (1) in deciding whether the work shall be undertaken at all, (2) in formulating the standard, and (3) in bringing about its ultimate approval as an "American standard."

In one important particular the method of work of the committee differs from that of the foreign national standardizing bodies. When the committee was formed there were already a large number of organizations doing standardization work. This led to a policy of decentralization, each sectional committee being organized by and under the leadership of one or more of the principal bodies interested. Such bodies are known as "sponsors." This plan makes the committee the most decentralized of all the national standardizing bodies.

APPROVAL OF EXISTING STANDARDS

For some time the unification of existing standards will necessarily form an important part of the committee's work. The rules of procedure provide that an existing standard "may be approved by the main committee, if, in its opinion, the standard has been developed by an organization and procedure substantially in conformity with these rules, or it has, by actual practice, proved its right to become a standard," without the standard having gone through the machinery of a sectional committee.

At one time the committee intended to withdraw the provision in this procedure providing for the approval of existing standards, but the development of the method of handling the approval of such standards, and further experience with it has shown it to be a valuable and flexible method of bringing about national agreements on standards. Hence it is now planned to continue the provision indefinitely.

An organization like the American Electric Railway Association may have many relations to the work of the American Engineering Standards Committee—as a co-operating body, with representation on sectional committees; as a sponsor; as a body submitting existing standards for approval; and as a member body having direct representation on the main committee.

SUSTAINING MEMBERSHIP

I have often been asked as to methods of financing the work of the American Engineering Standards Committee. A plan of permanent financing has been worked out through sustaining memberships. Industrial concerns are being asked to subscribe directly. The schedule of subscriptions recommended is on a basis of approximately 1 cent per $1,000 of annual gross receipts. More than 200 sustaining members have now been enrolled.

It is already apparent that such sustaining memberships are going to play a very important rôle in the actual work itself, since they provide a direct channel through which the firms interested in standardization work may be kept in direct and intimate contact with the standardization work which concerns them.

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*Abstract of a paper before the annual convention of the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 8-11, 1923.

RELATION TO THE GOVERNMENT

Few people who are not in immediate contact with the standardization activities of the federal government have an adequate realization of how extensive these activities are. Nearly all of the ten regular departments and the various independent establishments are doing more or less standardization work which directly or indirectly affects the industries generally. This falls into two general categories: first, that carried on chiefly in the form of specifications by the purchasing agencies of the government; and second, that carried on by the research and investigational bureaus. Such research agencies as the Bureau of Standards, Bureau of Mines, Bureau of Public Roads and the Forest Service are carrying out much important research work, the results of which are of great value to the industries concerned, and many of them have an intimate bearing upon problems of industrial standardization. These bureaus cooperate effectively with trade associations and national engineering societies engaged in the various special fields of engineering and industrial standardization, and they are now actively participating in the extensive program of standardization work going forward under the auspices and procedure of the American Engineering Standards Committee.

The federal government is one of the largest purchasers of industrial products, both as to the amount and the range of supplies which it requires. One of the early acts of the first Director of the Budget was the organization of the Federal Specifications Board, composed of representatives of the various purchasing agencies of the federal government under the chairmanship of the director of the Bureau of Standards. Its purpose is to unify government specifications and to bring them into line with the best commercial practice. Government specifications are being submitted to the A.E.S.C. for criticism and to determine their acceptability to industry. The Federal Specifications Board, together with the Bureau of Standards, maintains a liaison representative for cooperative work with the A.E.S.C.

The division of simplified practice of the Department of Commerce concentrates its work upon the elimination of unnecessary lines, types, and sizes of manufactured products, particularly in those situations in which decisions must be made upon a non-technical basis.

A.E.R.A.'S RELATION TO THE MOVEMENT

The A.E.R.A. is represented on the main committee by the chairman of its standards committee, Martin Schreiber. From the first, the association has taken an active interest in the work of the A.E.S.C., and is co-operating extensively in a large number of projects.

Naturally much less has yet been accomplished in international industrial standardization than in national work. Yet beginnings have been made in several fields and in some lines substantial progress has been made.

From the very nature of industrial standardization it should be evident that there must be a full, mutual understanding and appreciation of the problems and point of view of the various parties at interest. This is true regardless of the scale upon which standardization in any particular project is carried out. The secretaries of the national standardizing bodies made the question of interchange of information a principal consideration in their conference in London two years ago, and again in Switzerland this summer. Information on the status of all projects before the national bodies is regularly and automatically interchanged among all of the national bodies, and the way has been paved for a very extensive interchange of information on a project at all stages of progress in its development.

It seems to me that the problems now confronting many of the national standardization movements are much the same as those that surrounded the movements toward trade associations in this country a few years ago, while international standardization will follow in much the same way, but without going so far or so rapidly. Whatever the ultimate outcome may be, it seems to me that the next step in any case is the same—to develop as full and as free an interchange of information as conditions will permit.

Maintenance of Men[*]

By Hart E. Fisher, M. D.

Chief Surgeon
Chicago Elevated Railroads

Care Should Be Used in Selection of Employees to Eliminate Defectives—In This Way Accidents that Are Due to Man-Failure Can Be Lessened Materially

Hart E. Fisher

IN ANY public utility company will be found departments organized to carry on the different functions of the business. In railroad companies the transportation department is in charge of the operation of trains and service directly to the traveling public; the electrical department has supervision over all things electrical, pertaining to transportation; the maintenance of way department, supervise the construction and maintenance of tracks, roadway and buildings. There should also be a department for the maintenance of men—in charge of all activities having to do with the health of employees in their relation to the industry. Not every railway line should have a medical department with the various branches of its work, as this would be impractical from an economic standpoint; but there is no road so small but that it can well afford to adopt a regular medical policy.

This maintenance of men is incorporated in the Chicago Elevated Railroads in the work of the medical department. The management believes, and experience has proved, that the real work of a medical department is along the line of prevention; that the company should do all that is humanly possible to correct conditions so that environment of employees is sanitary and healthful; to adopt appliances and practices that will prevent injury to employees or passengers, as well as to select those employees who are physically and mentally fit for the duty of transporting the public, and after employment, to maintain these workmen in a healthy condition.

Causes of accidents and inefficiency on the part of employees are prevented by careful physical examination of all new men and frequent re-examination of old employees at regular intervals, as experience and conditions warrant. Also examine all employees after any unusual occurrence or accident, to determine if any physical or mental condition exists which might have been the cause of such accident.

PHYSICAL ILLNESS OR DEFECTS

Defective vision, undetected, is a direct cause of accident in a great number of cases. A person with defective vision—near or far—is a poor judge of distance, and slow at what is known as accommodation. For that reason he does not see the source of danger as readily as the man with perfect vision. Frequently, when a man is told that he has defective vision, he replies that he can see as well as you or I. That may be a fact as far as the man is concerned because his defect has come on gradually, but nevertheless he is under a constant strain and it is only a qustion of time before the sight becomes more impaired and an accident occurs. This eyestrain is also the cause of incivility on the part of trainmen to passengers, as the eyestrain causes a nervous tension, and, if headache is present, you will have an irritable person to deal with.

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[*] Abstract of a paper before the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 8-11, 1923.

Sometimes an injury, trifling in itself to the normal eye, will result disastrously to an eye that has defective vision.

Stereoscopic or double vision is a direct cause of accident. Astigmatism, with the accompanying sudden fogging of vision, both partial or incomplete in one or both eyes for a short period of time, will occur just when normal sight is most needed. Eyestrain is often conducive to dizzy spells at a time when one needs normal equilibrium, and the sufferer is himself injured or causes injury to a passenger.

The remedy for defective vision is properly fitting glasses to relieve the nervous strain and correct the error of refraction. However, glasses often are, in themselves, a source of danger. They may be left at home, lost, or broken and the employee who goes to his work without them runs the risk of having an accident because he is not accustomed to working without glasses. Very often the lenses fog from the cold or from perspiration, partly obscuring the vision and the man is hurt. Even soiled or smeared lenses are causes of injury. One of the greatest risks is that of the glasses being broken and a piece injuring the eye when the object which struck the glass could not have struck the eye itself. Colored or tinted glasses are taboo, especially in train service, where they may cause a change in the man's ability to distinguish signals.

Any man who is color blind has no place in railroad or marine work if he is to handle the public safely and competently operate trains or train signals. Those colors most often confused by the color blind are unfortunately the very ones that designate train signals—red, danger; green, clear. Some color-blind men work, apparently with safety, when no examination is made. They watch the switch points when they see a signal color or the signal arm, and if two lights are used they know which is the red and which green by the way it is lighted—top red and bottom green, or vice versa. It is essential that more than one color test be made, and be sure that your doctor is not color blind himself. Do not take for granted that having once tested an employee for color blindness and found his sight normal that he will always remain so. I have, personally, found four cases developing in motormen who had previously passed many tests as normal. Disease had been the cause of the defective color sense developing and was detected in the regular reexamination of employees.

Defective hearing is a frequent cause of accident. It comes on gradually. The deaf one finally has an accident because he did not properly understand orders, or in his effort to hear, he became confused and accident resulted. Some people who believe they are becoming deaf, after removal of impacted ear wax, find that they hear perfectly. Deaf people are prone to become irritable due to their defect and act impulsively, thereby causing accident. Defect in hearing is often the source of complaint by passengers of incivility on the part of an employee by reason of his speaking too loud, not paying attention when addressed, or because he gives wrong information due to not having heard the question correctly.

Some deaf people operate trains with apparent safety by watching the hammer of the signal bell, looking out to see that all is clear before starting, etc., where no examination is made. Placing of an employee who is deaf on the witness stand, in litigation, makes a very unfavorable impression on the jury. There are a great many people with defective sight, color blindness, and deafness driving automobiles who are the cause of accidents.

Very often an employee who has an accident remarks that he cannot remember what happened. He is correct or he undoubtedly had a fainting spell, heart failure (syncope), and of course he cannot recall the details of his accident. Examine these cases and see if the heart is not the offender rather than the employee's carelessness. Defective hearts are also the cause of absenteeism from work. Employees should be carefully examined for heart conditions after such illness as rheumatism, infection, and contagious diseases.

A man may have a sudden weak spell due to his defective heart, exaggerated by indigestion due to overeating just prior to going on duty, and the temporary loss of his full faculties results in an accident. There is no place for sentiment when a motorman is found to have a defective heart, and you will have to play absolutely safe here.

Neglected teeth are responsible for a large amount of the rheumatism and so-called stomach trouble. If we urge upon employees the great benefit to be derived from caring properly for the teeth, the rate of absenteeism can be greatly reduced.

An employee with hernia or rupture is liable to be overcome by a sudden weak spell or pain in the groin or back, causative of injury. If you question a man who has dropped some object on his feet or suddenly let loose of something with disastrous results, he will very often say that he had a pain or felt weak and let go. Examine him for rupture. If these cases have trusses on, they are handicapped by the truss, which often slips on exertion and is the cause of injury. Operate on all hernias in young or middle-aged men, and, when they are found in old men, place the man on a job where muscular effort is not necessary. Symptoms of hernia direct a man's attention from his work. An unsupported hernia is liable to strangulate and cause the death of the patient.

Trainmen, because of the nature of their work, are obliged to be on their feet for long periods of time, and if they have varicose veins or flat feet they very quickly become fatigued, less agile, and mentally irritable to passengers and may cause injury to a passenger by reason of having their minds diverted from their work.

It is said that with old age one also becomes cross, crabby, neglectful. If examination is made of these employees you will find, no doubt, that they are suffering from some illness which is undetected or of which the patient knows but keeps from his company. Ofttimes an old employee is found going to sleep on duty—examination may show that he has Bright's disease, diabetes, or some illness which causes a temporary drowsiness to come on over which he has no control. This is frequently the explanation of accidents or collisions when the motorman or engineer has a clear view ahead, as well as for running past stations or meeting points. Employees must have the full use of legs, arms, and fingers properly to protect themselves from injury.

MENTAL CAUSES OF ACCIDENTS

Observation of an employee gives a clew to his mental or physical defects, which, undetected, may lead to accident. A neat, clean man is often a safe and healthful man, while the slovenly, careless person is very liable to be an inefficient and unsafe worker, as well as an unhealthful individual. The nervous, excitable man because of his quick, impulsive manner of doing things is frequently the direct cause of accident either to himself or to a passenger; more often, probably, he gives rise to many complaints from passengers on account of his actions. The loud, boisterous fellow is conducive to accident and offensiveness to passengers. Courtesy cannot be expected from the boisterous, loud chap because he knows no such thing as courtesy.

The worried, troubled, or agitated state of mind is the cause of innumerable accidents in industry today. Worry over financial matters, grief over family illness or death, anger or strife in the home or at work, hatred, malice, or envy of one's fellowmen are all conducive to accident. When a man is angry and in a temper, he acts impulsively, taking chances and doing things which he would never think of doing in a peaceful frame of mind.

If the work at hand calls for constant repetition, the man assigned to that task should not be of a nervous or temperamental type. There is also the fixed mind such as that one which minimizes all rules, work, or anything coming from the employer. The radical is in this class. So is the old employee who has been in the habit of doing a thing his way and will not be told how to do it in a better or safer manner.

One of the greatest factors in accidents is fatigue of mental faculties on account of the routine nature of the work. A man listening to the constant click-click of the wheels passing over the fish plates is soon lulled into a drowsy state of mind and his faculties become clouded. Although apparently in full possession of his senses, he fails to apply his brakes in time and an accident occurs.

You can overcome this fatigue due to routine, monotonous work by having the employee change his work or rest at certain periods. For example, have motormen stand up when they approach stations, meeting points, junctions, etc.

Reviews of Report of Committee on Bus Operation[*]

By H. W. Alden
President
Society of Automotive Engineers,
New York City

Co-operation of Electric Railway and Automotive Interests Is Essential to Proper Development of Transportation—The Bus Is Here to Stay and Should Be Incorporated in the General Transportation Scheme

IT IS not too early for the designer and builder of motor buses to get together with the user. Only by sincere and hearty co-operation can satisfactory progress be made. Plain speaking on both sides, if of a constructive nature, is to be welcomed by both sides. I feel that at this, our first official appearance with you, we should not be too argumentative. It is of far more importance that we both get together as we are doing now.

Your committee is to be congratulated on the breadth and scope of its investigations. It should furnish an excellent foundation for future endeavors. Judging from the phenomenal growth of bus transportation, both in city and intercity work, it is very evident that the motor bus fills a certain need in the life of the nation. Here it may be overdone. Here it will be foolishly handled. Out of it all, however, will gradually emerge a new form of passenger transportation, giving a service which the street railway never can give. In the last analysis, however, it will remain only when and where it can make money for the operator. This is the final test—it must be a revenue producer.

H. W. Alden

In getting together by very limited discussion, I wish to give credit for great assistance in preparing these notes to the publishers of *Bus Transportation*, Colonel Green of the Yellow Coach Company and to Mr. Horner of the General Motors Corporation. Your attention is also directed to a paper by W. P. Kennedy before the metropolitan section of the S. A. E., on the subject of trolley buses, and to the discussion of this paper. In both there is a great deal of valuable information.

Proceeding now to the report proper, the first thing that struck me was that the companies investigated were all street railway companies. I can readily understand that to carry on a complete investigation covering the operation of outside or independent bus lines might have been quite difficult and might have been contrary to the policy of the association. It would seem, however, that the figures presented by the report would have been somewhat different if independent companies had been included, because a great many bus companies are making money.

The general summary of the results reported by your twelve companies investigated shows a net loss. We should not jump at the conclusion that this is a chronic and expected condition. Your report, however, does show that four out of the twelve companies had a revenue in excess of expense. Two of the twelve had such ridiculously low revenues that it would seem that they had tried to operate under impossible conditions.

It would appear to us that your association ought to extend its official investigations to independent companies. It is realized, of course, that the conditions under which many of the independent companies operate are free from some of the handicaps that the street railway companies are saddled with. On the other hand, the street railways have always been firm believers in trying to get a clear picture of what the other fellow is doing and making it a matter of permanent record.

Furthermore, the investigation covers only single-deck buses. Now there are many places where a double-deck bus is to be desired, as evidenced by its success in London, New York City, Chicago and Detroit, in all of which cities the revenues exceed expenditures by a comfortable margin.

It is gratifying to us motor people, however, that in spite of the rather gloomy picture painted, the consensus of opinion among your operators seems to be that the motor bus is here to stay. The early years, so to speak, are, however, painful. They appear to be so in this case. However, I am informed that in 1921 composite results of fifty-two city railways showed 46.5 cents a mile revenue and 45.7 cents a mile expense. This is not a particularly rosy picture either.

SOUND AND ECONOMICAL REASONS FOR USING THE BUS

In analyzing the reasons cited by your companies' investigators as to why motor bus transportation was undertaken considerable light is thrown on the subject. These can be roughly classified as follows: (a) To meet competition; (b) to give better service; (c) to fulfill an obligation resting upon the transportation system which has the monopoly of transportation; (d) to feed new territory at a minimum investment and expense.

These are all very sound and economic reasons. I venture to suggest, however, that in some cases, at least, the proper equipment was not chosen. Too much care cannot be given to this

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[*] Abstract of a contribution to the discussion on bus operation before the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 8-11, 1923.

COMPARATIVE STATEMENT OF MAINTENANCE COST PER 1,000 CAR-MILES FOR CARS AND EQUIPMENT OF CITIES NA

Account	Atlanta				Memphis				Birmingham				Little Rock		
	July, 1923	Year to Date, 1923	July, 1922	Year to Date, 1922	July, 1923	Year to Date, 1923	July, 1922	Year to Date, 1922	July, 1923	Year to Date, 1923	July, 1922	Year to Date, 1922	July, 1923	Year to Date, 1923	July, 1922
Superintendent of Equipment	.848	.863	.875	.931	.86	.81	.86	.87	1.7	1.5	1.6	1.7	1.82	1.96	1.72
Passenger and Combination Cars	8.802	10.498	9.586	10.136	13.75	14.37	14.36	14.43	10.5	12.8	17.00	15.70	11.77	12.78	13.83
Freight and Express Cars	.45	.008	.005	.012	....	.....	.....	.....	....	....	.....	....	.....	.....	.....
Service Equipment	.138	.265	.222	.202	.96	.47	.37	.23	.1	.4	.6	.3	.15	.14	.08
Electrical Equipment of Cars	5.812	5.123	4.997	6.047	5.82	4.89	5.47	5.42	7.1	6.9	8.4	8.3	6.97	8.94	6.34
Shop Equipment and Tools	0.48	0.46	.102	.102	.13	.20	.08	.13	.2	.2	.1	.2	.14	.29	.53
Shop Expenses	1.494	1.133	.715	.866	.83	.99	.87	1.03	1.2	1.2	1.3	1.2	1.42	1.35	1.42
Miscellaneous Equipment	0.56	.119	.042	.079	.....	.....	.....	.....	....	....	.....	....	.....	.....	.....
Total Maintenance	7.245	18.055	16.545	18.377	22.35	21.73	21.31	22.11	20.7	23.1	29.00	27.6	22.28	25.46	23.93
Renewals and Replacements, Mechanical Department Only, 1922	No record				$11,409.27				$58,915.46				None		

point. Differences in types of vehicle may easily be the difference between red and black figures at the end of the year.

Proper routing is another important element, probably not any too well understood as yet.

The speed of operations is a very important factor not very thoroughly covered in the report. A change in motor cars, gear reduction, etc., which would raise the average speed of a city bus even so much as 10 per cent might also change a loss to profit.

Little appears in the report on special forms of equipment for special services which may, when properly catered to, mean the difference between a deficit and a surplus. The motor bus is excellently adapted to give express service, which is something that even double-track street railways cannot give. The double-deck bus, furthermore, creates a traffic of its own and people delight in the upper-deck comfort. I mention these points simply to bring out the fact that when all of these features of motor bus transportation are studied and their revenue-producing capacity made available the net operating financial results might be quite considerably altered.

We have found in Detroit that twenty-five-passenger one-man buses can be operated with very much less money per mile than even the small one-man street cars, and are going to be very considerably used for outlying territory, operated in conjunction with the railway department for the city.

I had expected a complaint from your committee that much of the equipment that the members of your association had been compelled to buy was little more than built-over commercial cars and chassis. The motor bus builder is open to criticism, in nearly all cases, in trying to do just this thing. Some of the companies, of course, have recently made up and developed special equipment. Bus service demands special equipment from end to end, designed primarily for bus service, because conditions and requirements are totally different from those resulting in merchandise transportation.

On the subject of depreciation there is a wide variation in your practice. Surely these figures might be brought more nearly uniform. On the whole, it seems as if the figures taken are unnecessarily high. Given the right equipment; that is, one which will not soon become obsolete, a ten-year life is not unreasonable, when the vehicles are operated under good maintenance practice. Their table gives depreciation as about 13 per cent of the total expense on the average. This seems high. Of course, in the early days of any project it is wise to err on the safe side, but it would seem that there were enough well established data, as evidenced by the London General Omnibus and the Fifth Avenue Coach Company, to indicate 7 or 8 per cent as being an adequate depreciation. I note that your committee advises its members to study carefully the practice governing depreciation. This is very timely advice.

It is very gratifying to see the earnest purpose of your association to take up this new instrument, which our industry has produced, and to give it a fair trial. We know that we are just beginning to understand the problems to be met. We pretty generally appreciate now the necessity of quite special equipment. Working with you, we can more and more meet your requirements. On the other hand, you will have to give these new things a fair chance to see what can be accomplished with bus operation, as you have in most cases done with the idea of making it financially successful. The motor bus has many fundamental characteristics that make it excellently adapted to fill a public need and ought to enlarge your field of operation, enable you to hold business you otherwise would lose and, properly combined with your railway operation, it should lead to ultimate economy and operation of the entire system.

Mechanical Men's Association Improves Maintenance*

By A. D. McWhorter

General Superintendent
Memphis Street Railway

A. D. McWhorter

How the Southern Properties Have Combined to Exchange Monthly Reports and Information—As a Result Maintenance of Equipment Figures Are Tending Downward

REALIZING that the individual can measure his standard of efficiency only by comparison, the Electric Railway Association of Mechanical Men, Southern Properties, embracing Birmingham, Nashville, Little Rock, Dallas, New Orleans, Mobile, Atlanta and Memphis, was organized in Memphis, Tenn., in April, 1922. The object of this association was to create friendly competition and increase the efficiency of the mechanical men and the mechanical departments by comparing monthly operating results of the various companies.

Previous to the organization of the association, several of the properties had been exchanging monthly reports on car pull-ins and average miles per pull-in. These reports are still being exchanged and, in addition, we are exchanging reports showing the total maintenance cost of equipment, subdivided as to the various accounts, also a statement showing cost of inspection and car cleaning. These reports are posted in the shops of the various companies and the rank and file of all the organizations are kept posted and know how they compare with the other member companies.

Each member sends his report to Memphis as early after the first of each month as is possible. A standard form of classification is used by all members.

ONTH OF JULY, 1923, AND FOR YEAR TO DATE COMPARED WITH SAME PERIOD OF PREVIOUS YEAR

	Dallas			Mobile				New Orleans				Knoxville				
3	Year, to Date, 1923	July, 1922	Year, to Date, 1922	July, 1923	Year, to Date, 1923	July, 1922	Year, to Date, 1922	July, 1923	Year, to Date, 1923	July, 1922	Year, to Date, 1922	July, 1923	Year, to Date, 1923	July, 1922	Year, to Date 1922	Account
67	.765	.63	.69	1.52	1.85	1.72	1.95	3.02	2.80	2.49	2.17	1.02	1.84	1.7	1.8	Superintendent of Equipment
06	13.604	13.29	15.39	18.50	17.80	19.00	23.10	14.68	16.25	29.17	31.30	10.30	19.55	30.5	23.2	Passenger and Combination Cars
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Freight and Express Cars
45	.469	.63	.21	.58	.40	1.14	.40	1.20	.99	.90	.68	.05	.25	.8	.8	Service Equipment
37	7.813	7.96	7.21	4.30	4.80	5.60	5.00	10.81	11.56	17.34	15.79	7.10	11.80	12.3	12.7	Electrical Equipment of Cars
76	.296	.21	.38	1.65	1.92	1.75	2.20	.42	.42	1.05	.94	.06	.18	.6	.5	Shop Equipment and Tools
3	1.729	1.70	1.60	.....	.....	.....	.....	.99	.98	1.00	.93	.20	.68	.5	.8	Shop Expenses
02	1.095	.53	.50	.05	.30	.05	.29	.74	.90	1.22	1.29	.05	1.68	2.7	2.8	Miscellaneous Equipment
65	25.771	24.95	25.98	26.60	27.10	29.40	33.30	31.86	33.90	53.17	53.10	18.74	36.09	49.1	42.6	Total Maintenance
	$193,496.01			No record				$471,433.96				$85,735.82 All Depts.				Renewals and Replacements, Mechanical Department Only, 1922

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*Abstract of a paper before the annual convention of the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 8-11, 1923.

When these reports are received, we prepare a statement, compiling figures covering all cities, showing the monthly operation and yearly figures to date. A copy is sent to each member about the tenth of each month.

The results obtained, as shown in the accompanying tables, have been most gratifying to both the mechanical men and the management of the various properties. The maintenance of equipment figures are tending downward, so we feel that we are accomplishing something worth while.

We have two meetings each year, in January and July rotating among the various cities. We have two-day sessions. The first day is spent in discussing various problems that are common to all and giving each other the benefit of our experiences, etc. The second day is spent in inspecting shops and carhouses.

AVERAGE MILES PER PULL-IN AND PERCENTAGE OF INCREASE IN MILES PER CAR PULL-IN FOR EIGHT MONTHS OF YEAR ENDED AUG. 31, 1923

Property	Average Miles per Pull-In Chargeable to Carhouse.	Average Miles per Pull-In Not Chargeable to Carhouse.	Total Average Miles per Pull-In.	Percentage of Increase in Miles Operated per Pull-In.
Atlanta......	8,143	16,971	5,502	71
Birmingham.	10,683	61,244	9,095	173
Dallas.......	2,353	6,639	1,737	16
Knoxville....	8,929	24,135	6,517	772
Little Rock..	8,944	19,045	6,086	251
Memphis....	15,128	42,601	11,164	2
Mobile......	6,201	17,508	4,579	3
Nashville....	10,948	27,049	7,202	107
New Orleans.	45,394	40,679	21,454	665

Control and Handling of Materials and Supplies*

By P. F. McCall

Superintendent of Materials and Supplies
Chicago, North Shore & Milwaukee Railroad

Handling of Stock in the Storeroom Is Facilitated by Proper Methods—Perpetual Inventory Is as Effective as Annual System and Less Subject to Mistakes

THE business of controlling and handling materials has certain fundamentals which may not be disregarded. Charged with the responsibility of requisitioning, receiving, storing and accounting for all materials used on the property, it behooves the storekeeper to employ methods which will keep his stocks intact until the materials are placed and charged to the proper accounts. The most effective methods of properly controlling materials include the use of a stock book, a standard classification of materials, accurate inventories and daylight storekeeping.

A stock book should be maintained for more important uses than as a mere history of material purchases and disbursements. Properly watched, it will eliminate that sad old story, "We are out of that item; come back next week," as the use of minimum records will point out the low level to which the stock may be carried safely. It will also disclose to the observing storekeeper obsolete or slow-moving items of materials; give an accurate check on scattered or isolated stock; show the turnover for any desired period, and as an indicator of future requirements will more than justify the expense of its maintenance.

Proper control of stocks is greatly facilitated by the use of a system for the classification of materials into groups according to their general or specific uses. Having determined a class to which an item of material properly belongs, a designated symbol or lot number, other than that furnished by the manufacturer, should be given that item.

The physical arrangement of the stock in the storeroom should follow the same order in which the items are listed in the stock books. By using a lot number system and applying the same lot numbers to the pages in the stock book or ledger a cross index system is given for ready reference. If values are carried in the stock book a consolidated report can be made out in classified order at any period desired, showing the value of stocks on hand, purchased and disbursed in each class.

The generally accepted idea of an inventory is that the stores department should be closed up for the time required to count and weigh each item at least once a year, but it is questionable if this is just the way to do it. On most properties the stores department has become a very necessary part of the railroad organization, and to close up this department for a period of several days necessarily has a very decided effect on others who rely upon it for service. Up-to-date manufacturing companies have ceased to close for inventory purposes. They have instead installed systems which will tell them at all times the amount of money tied up in their raw and finished products.

A perpetual system of inventory is just as effective as the general annual inventory and is less subject to mistakes because the organization is not rushing to get it finished. Further, the perpetual system permits of frequent small adjustments which are not possible under the annual system. On the railroads which I represent we maintained the perpetual inventory for a period of over five years before our officers decided that a general annual inventory should be taken, and we found that the total adjustment necessary upon the completion of the work was about one half of 1 per cent.

Good housekeeping is a very essential thing in the proper control of materials, and I know of no better way than to use what is known as the daylight system of storekeeping. The system is very simple and consists of skeleton shelving with trays, into which the materials are neatly piled in uniform count. The trays containing the materials are then piled on top of one another. A collective system of tagging is used, beginning at the bottom and running to the top, so that the amount shown on the tray next to the top which contains the highest uniform count, plus the broken amount in the tray on top, gives at a glance the exact number of pieces or pounds in each tray.

This same idea can be carried into shops and yards where bulkier items of materials are stored, such as ties, rails, lumber, etc. These materials can be handled in exactly the same manner as those in the storehouse, with the exception, of course, that no trays are used. Materials are simply piled in uniform units, which are very readily counted without being pulled down or moved for inventory or reordering purposes. After having used this system only a short time I found it necessary to make a check of our maintenance of way materials some ninety days ago, and it developed that we were able to take the inventory in just 50 per cent of the time formerly used to inventory the same amount of material.

The system discloses at once any careless or dirty methods of storing material, particularly if the shelving is painted white. The whole scheme is made much more pleasing by having a white storehouse interior. This may seem ridiculous in view of the character of materials handled on electric railways, but it is surprising how long the effect can be maintained.

Storekeepers owe it to their companies and themselves to insist upon the best housing facilities for their materials that the financial condition of the company will allow, keeping in mind that the materials in their care often represent more value than the cash carried in the treasurer's vaults. A clean, orderly system of housekeeping in storehouses and yards, together with an energetic effort on the part of the storekeeper to have his department render real co-operation and service to the department using the material, is bound to bring recognition from his executives and success to the department as a whole.

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*Abstract of a paper before the annual convention of the American Electric Railway Engineering Association, under the auspices of the committee on purchases and stores Atlantic City, Oct. 8-11, 1923.

Some Practical Results of Commission Regulation

In a Symposium Conducted by the American Association, the Public Service Commissioners Themselves Tell What Has Been Accomplished—The General Trend of Regulation Is Favorable, Although There Have Been Some Unfortunate Laws Passed that Have Made the Work of Regulatory Officers Difficult

A NUMBER of the leading utility commissioners were invited by President Emmons to take part in a symposium at the Wednesday morning session on the general subject of public utility commission regulation. The response to the request was excellent, and the papers presented showed that the speakers have been giving much thought to the problems of the day, one of the most pressing of which is the ever-present one of bus competition.

The symposium was opened by Dwight N. Lewis of the Iowa Board of Railroad Commissioners. He was followed by Henry C. Attwill, chairman Massachusetts Department of Public Utilities; Charles C. Marshall of the Public Utilities Commission of Ohio; Lewis E. Gettle, chairman of the Wisconsin Railroad Commission, and William Milnes Maloy, chairman of the Maryland Public Service Commission. The interest taken was so great that it was found necessary to defer until Thursday the paper by Henry C. Spurr, editor of *Public Utilities Reports*. Abstracts of the addresses appear below.

The Iowa Law of Convenience and What It Implies*

By Dwight N. Lewis

Member Iowa Board of Railroad Commissioners

WE HAVE recently had added to our duties the administration of a motor bus and truck law. Like the psalmist sang of himself, "It is fearfully and wonderfully made." In one section it provides that the board shall grant a certificate of operation to a bus or truck operated for public hire if it is shown it would promote public convenience so to do. The words "or necessity" were in the original bill, but were stricken out on later consideration of the measure. The penalty clause, also the one requiring the board to fix rates, were both stricken from the bill in final passage. The only penalty now provided is that the board may revoke the license.

Dwight N. Lewis

The question is being presented to us constantly as to whether a particular bus or truck line will produce such competition as will be ruinous to competing steam or electric railways. The only question under the law for our board to determine is whether the public convenience will be promoted by the establishment of the proposed bus or truck line.

In every case presented to us thus far since the law became operative merchants, professional men, citizens of all classes of occupation have insisted that such service would promote the public convenience. Railway operators, both steam and electric, have appeared before us protesting the granting of the franchises on the grounds that adequate service was then being provided by the carriers already established on the proposed route, that the addition of parallel and competing transportation would be an economic waste, resulting disastrously to the carriers by rail. The law does not provide that we shall consider anything but the promotion of public convenience.

Just what the promotion of public convenience means is not easy to determine. Must we take into consideration the possible effect of bus competition on the business of rail carriers, and its resulting consequences on the service which such rail carriers may eventually be justified in rendering to the public as a whole? Is the carrier by rail so sacred in the eyes of the law that there may never be a competing system of carriage permitted? Must all progress in the methods of carrying passengers and freight for hire be halted because the carrier by rail is already on the ground? If the public demands the right to ride in buses on the public highway or send its goods by motor truck, is it the business of a railroad or utility commission to say no? I am aware of the many commission decisions and some court decisions wherein it has been held that under the clause "public necessity" there was no necessity for the additional service by bus or truck when a carrier by rail, ready to serve, was already on the ground. How about it, however, when a commission is explicitly told by the legislature to consider the promotion of public convenience only? If, under these circumstances, we find it would be convenient for the public to have a bus line between two given points, competitive with a rail carrier, would it not further promote public convenience to have two bus lines or three or four, or a bus every five minutes maybe? *Reductio ad absurdum* perhaps.

It is not the business of an administrative body to determine the policy of the state. If the supreme legislative power says the promotion of public convenience is only to be considered, then it is not our province to inject other conditions into the act.

My own opinion might be that the rail carrier, with its hundreds of thousands of dollars of investment, ought to be protected; that it is in the interest of the public that the great tax-paying carriers by rail should not be hampered or destroyed by a bus or truck competition that may render service of a day or a month or a year, then find it unprofitable and quit.

You gentlemen engaged in the operation of systems of electric railway must meet and overcome the increasing competition of bus lines or get ready to quit. The outcome, it appears to me, is inevitable unless our legislatures come to the affirmative relief of the rail carriers.

It may be that the public demand for bus and truck service is a passing phase of transportation, but frankly, I do not think so. The ox train gave way to the steam train, the horse and cable car fell before the swiftly moving electric. Is the electric street car and the electric interurban line to pass into history with other discards of transportation and the motor bus and motor truck make of our highways the great means of public travel, as the caravans of old used the military roads of Rome?

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

It may be so, but before that day comes the public who builds and maintains these roads should protect itself against the additional expense, which the motor carriers should be compelled to pay, and better regulatory laws should be passed than the one under which we are trying to function in Iowa.

Altogether too late, the public may find that it has traded a cheap method of transportation for one that is costly, unsatisfactory and transient. In the meantime, what is an ordinary state commissioner going to do about it when his legislature tells him to grant a certificate if, upon investigation, he finds the proposed bus or truck service would promote public convenience?

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*Public Regulation in Massachusetts**

By Henry C. Attwill

Chairman Massachusetts Department of Public Utilities

THE Great War, as we all know, put public regulation to a severe test, and in the minds of many well-informed people public regulation failed to meet the test.

Public regulation is good, bad or indifferent, according to the powers the public board exercises and more particularly according to the courage and the character of the persons who constitute the board. In Massachusetts I feel on the whole that the regulating bodies during the war met their responsibilities well. It is true that in Massachusetts the two largest railway systems passed from private management into public management and control, one the Boston Elevated Railway system, in my judgment permanently, the other the Eastern Massachusetts Street Railway, formerly known as the Bay State, temporarily.

It was not due to public regulation, as we understood the term, that the disaster was brought about in relation to the Boston Elevated Railway system, but it was due to the increase in cost of transportation which made that company unable to carry passengers in a single continuous passage in the same general direction over the system for 5 cents, as was required by an act of the Legislature passed in 1897.

Public operation is to continue until 1928 and thereafter until such time as the Commonwealth may determine to surrender back the control of the properties to the stockholders. The trustees have operated the road now since 1918 successfully and I believe to the satisfaction of the public.

The situation in relation to the Eastern Massachusetts Street Railway was somewhat different. There was no limited fare. The company could increase its fares with the approval of the state regulating body so as to meet the mounting cost of transportation. There again the Commonwealth, through its Governor, appointed five trustees to manage and operate that system. It did not, as in the elevated act, guarantee any dividends. It assumed no obligations whatsoever other than to guarantee the payment of certain serial bonds which under the act the trustees were authorized to issue, not to exceed in the aggregate $5,000,000. The operation of that road by public trustees ceases at the expiration of ten years. The other street railways in Massachusetts have continued under private management, substantially with the same laws that applied to them prior to the war.

H. C. Attwill

In the latter part of 1919, the department of which I am a member was organized. It took over the powers that were formerly exercised by what was known as the Public Service Commission, and also the powers that were formerly exercised by what was known as the Board of Gas and Electric Light Commissioners. In view of the financial situation of the street railways in Massachusetts, its policy has been not to interfere with the management of those street railways in the determination of what fare should be charged to the public, or what fare areas should be established, so long as there did not appear in the new arrangement any undue preferential treatment or unjust discrimination.

Of course, they have been obliged to increase their fares to meet the increased cost, either by directly increasing the fare or by shortening the ride that formerly was given for the fare. With a few exceptions, the street railways of Massachusetts have steadily improved in their financial condition, and I believe that the financial crisis, so far as the railways are concerned, has been passed.

It will be observed that broadly the general policy of the commonwealth of Massachusetts is this: that it proposes to allow public utilities to secure sufficient revenue in charges to preserve the financial integrity of the utilities. We in Massachusetts believe that any other policy is suicidal and is bound to result in disaster both to the public and the utilities alike.

Notwithstanding the sound and conservative manner in which Massachusetts has dealt with her utilities, it has not, in my judgment, dealt with the so-called jitney or motor bus adequately. That has been left to the local communities to determine whether they will have motor vehicles carrying passengers for hire in competition with the street railways. The only thing the state board has to do with it is that the street railway or any person has a right to appeal to the state board in relation to the regulations which govern the operation of the motor vehicle.

We have been in much the same position as that referred to by the previous speaker; that the policy of whether they will compete under the act is not for us to determine so long as the regulations which govern them insure the safety of the passengers and adequate compensation in the event of disaster.

Street railways in my judgment must give the motor vehicle careful consideration. In Massachusetts the local communities have exercised on the whole splendid judgment in granting licenses to motor vehicles, but in some areas we still have unwise competition, but it seems to me the only intelligent thing for street railway companies to do is to pre-empt the field in relation to motor buses and establish such service wherever they can, where the buses will pay and the street car will not pay.

I think the railway companies have been too reluctant in the past to do that which private individuals are attempting to do with the motor buses. In Massachusetts there is no field for the motor bus and the street car competing with each other. Where such a situation exists it means that either one or the other, or both, will have to go out of business. After all, when all is said and done it is largely an economic question.

In conclusion, I am going to express to you some convictions that I have gained through my experience in public affairs. In order that I will not be misunderstood or that I will not be misquoted, I propose to read to you those convictions if you will bear with me for a moment:

It is only by wise and intelligent regulation of public utilities that their operation by private management can hope to succeed. Such regulation can only be exercised by the same board with broad powers, representing the public. Such a board must be constituted of men of intelligence, but above all men of character and courage. The members of the board must recognize that the utility, to serve the public, should be assured of conditions which will enable it, under honest and prudent management, to obtain a fair return upon its invested capital.

Courts, with but indifferent success,

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

have tried to define what is a fair return. Their lack of success in defining with exactness and precision what is a fair return arises from the fact that the question is an economic one, rather than a legal or constitutional question. To obtain a fair return, a public utility ordinarily should be allowed to charge rates that will maintain its credit and enable it to issue its securities at par. This, of course, assumes that the company has been honestly capitalized and prudently managed. Given these conditions, any return less than that necessary to maintain its credit and yet enable it to issue its stock and bonds at par is an inadequate return and will result in injury to the company and the public alike.

Without credit and without the ability to secure new capital, no company can hope to give the service the public requires and demands. The public utilities, in my judgment, will never obtain the desired result by resorting to the courts. Ordinarily such action tends to create hostility upon the part of the public, whose good-will the utility should constantly cultivate. It is only by constantly educating the public that, after all, so long as only reasonable returns are derived by the public utilities their interests are those of the utilities, that successful operation by private management will succeed. On the other hand, this result cannot be secured unless the managements of the utilities realize that they are engaged in a public service in which the public is entitled to the best measure of service obtainable for the least charge reasonably necessary to maintain the utility in a sound financial condition.

*Killing the Goose that Lays the Golden Eggs**

By Henry C. Spurr

Editor of "Public Utilities Reports"

AESOP was a very keen observer. In story form he illustrated some very common traits of character. There was a certain man, he said, who was fortunate enough to have a goose that laid golden eggs, but not being satisfied with a golden egg a day he decided to hasten matters by cutting up the goose and seizing the whole treasure at once. The result was that he lost everything. Now, the man might have said to himself, "I have a very unusual goose. It is true that it lays golden eggs, but, unfortunately, it has an appetite, just like any other goose. Perhaps it will not do to kill it. I have a better plan. Instead of cutting up the goose I will cut down its food. Instead of giving it two handfuls of barley corn I will give it only one. I will thus save on the feed and make on the eggs." But in the end this policy would be as fatal for the goose and as bad for the man as the other.

SIMILAR TREATMENT OF RAILWAYS

For a number of years the public, by the machinery set up for that purpose, has been trying to find out how little corn the goose can get along on. We have been very much concerned about whether we should give the goose six, seven or eight handfuls of corn in exchange for the golden egg. Not only that, we have often been quite nasty to the goose. Notwithstanding the golden eggs, we have called the goose hard names. We have looked upon it with more or less distrust and suspicion. Our politicians have deemed it a fair object for abuse. There has been very little thought of treating it with kindness of generosity. Its appetite for corn has been a constant source of annoyance. Some have gone so far as to say the public is entitled to the golden eggs anyway, and that it doesn't matter whether or not the goose has any corn.

While the Board of Trade of Birmingham, England, was investigating railway charges it received a number of interesting letters from shippers. One of these, which the board said was characteristic, ran as follows:

"What we shippers want is to have our fish carried at half the present rate. We don't care a ——— whether or not it pays the railways."

Have we not seen many letters of this kind in the newspapers of this country on the question of the 5-cent street railway fare?

This attitude of the public toward the railways is, however, not so very surprising. It is a very common human trait or else Æsop's fable would have had very little point. The tendency to abuse our greatest benefactors is quite common. It often happens that

It's the man who does the best
That gets more kicks than all the rest.

These tendencies, however, while prevalent, are not universal and are subject to correction, and the problem is how to convince the public that the goose cannot live without food; that if there is any question as to the exact amount it needs, it is better to be liberal than niggardly; that after all a golden egg may be worth more than even seven or eight handfuls of corn.

The problem of how to make the public understand this is difficult of solution not only because of the weakness of human nature pointed out by Æsop but on account of the false attitude of the public toward its utilities.

The most serious obstacle in the way of a wise policy of utility regulation is the hostility of the public toward its utilities, and especially toward the railways. Perhaps street railways are worse off in this respect than all the others. The average citizen working in a shop or factory or holding some job behind a counter, or perhaps practicing law or medicine, is usually willing to admit that he knows little about the proper administration of a great private business enterprise, but no matter what the education or experience of the average citizen may be, he generally assumes that he knows more about how a street railway should be run than the men engaged in that business who have made a careful study of its problems. He therefore thinks he sees things to complain about which ought not to be complained about at all. It is largely a matter of attitude. As everybody knows, we do not care very much about what our friends do, but we are exceedingly fussy about the etiquette of our enemies. Hostility always breeds trouble.

It is therefore obvious that if this attitude of the public could be changed to one of friendliness toward the companies, as it should be, it would permit of the establishment of a most enlightened policy of regulation, which in my judgment would mean a minimum interference with the business policies of the companies and the allowance of a liberal return, such a return as would be really attractive to capital.

The public, with its mind open, could be made to see that perhaps it would be wise to allow the goose a little more corn than we have been giving it for its golden eggs. No such policy is possible, however, while the public mind is in its present state. No commission, adopting such a policy, could live. Even the allowance of very moderate increases in rates following the war put commission regulation under a severe strain, subjecting the commissions to violent political attacks in various parts of the country.

PUBLIC HARD TO CONVINCE

One would think, if the facts were with the railways; in other words, if they deserved the confidence and friendship of the public, they would get it On the surface it would seem that it would be necessary only to lay the cards on the table face up, as the saying is, but the cards have been in that position for a number of years. Under state commission regulation the books and other records of the companies have been opened for public inspection. We have found out all that we thought needed to be known about our railways and other utilities, especially how much money, if any, they were and are making. State regulation has shown the popular belief that utilities were operating at extortionate profits to have been a myth, but the average ratepayer's belief in the myth persists.

The public is very much like the insane man who thought he was dead. Nobody was able to convince him that he was alive. One day a physician had what he considered a happy idea. He would show the insane man that he was not dead. So he said to him:

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

"You think you are dead."

"I am sure of it," interrupted the insane man.

"Well," continued the physician, "I shall prove that you are alive. Let me ask you a question. Did you ever see a dead man bleed?"

"No," answered the insane man.

"Did you ever hear of a dead man bleeding?" asked the physician.

"No," was the answer.

"Do you believe a dead man can bleed?" continued the doctor.

"No," was the prompt response.

"Now, I shall show you that you are not dead," said the physician, taking a scalpel and drawing a little blood from the insane man's arm. "You see that you bleed. That proves that you are not dead."

"No," replied the insane man. "That only proves that a dead man can bleed."

The public was sure that the railways, as well as the other utilities, were making enormous profits, and that they only pretended that they were not. The public said: "We will set up commissions and establish the facts beyond peradventure." But when the commissions began to report that the railways would have to have more money; that they were not making unconscionable profits; in many instances were not making any profit at all, did the average car rider say, "This proves that I was wrong. The goose really needs a little more corn"? No, what he said was: "This proves that the books have been tampered with and that the companies control the commissions." I base this statement on newspaper editorials I have read and on expressions of opinion of persons with whom I have talked.

If the public were actually insane on the subject, it would be useless to try to convince it of the truth, but it is not insane. It is merely very strongly prejudiced against its railways and other utilities. Therefore the task of opening its mind by winning its friendship, while difficult, is not an impossible one and it must be accomplished. The public must be protected somehow against the politicians and a certain group of radicals who are constantly feeding upon its fears, suspicions and superstitions and urging it to injure itself under the mistaken notion that it is merely injuring the stockholders of the railways.

There is every reason why the public should be friendly, rather than hostile, toward its railways. An ordinary business enterprise, employing as many men as a street railway and conferring as much benefit upon the community, would be looked upon with friendly eyes and pointed to with pride. Why should not a street railway company—especially under state regulation—be viewed in the same way? What industry is more vital to the welfare of the community?

The attention of the public must be withdrawn a little from the corn and fixed upon the golden eggs. The value of street railway service to the public must be constantly emphasized. From Jan. 1 to July 31 of this year 59,483,519 passengers were carried on the Rochester lines of the New York State Railways. The average daily number of passengers for the first seven months of the year was 280,582, almost the entire population of the city. The average haul was approximately 3 miles. This does not look as if we could get along very well without our street railways. Aside from the mere convenience of this form of transportation for the average citizen, think of what it saves him in money. Think of what it would save him even if the fare were 10 cents instead of 7 cents, as it is.

The residents of the city have a choice of three ways of getting to work. They can walk, use an automobile or take the street cars. Assuming that the average distance from their business is 3 miles, as the average haul indicates, the saving of time back and forth, allowing for all delays, would be from an hour to an hour and a half at least. Is not the time of the average citizen, whether for work or for play, worth much more than the street car fares? If the street cars are used in preference to an automobile the saving is considerable. I do not know whether this has ever been estimated, but some one who is good at figures ought to be able to demonstrate about what is the saving per passenger, and this multiplied by the number of passengers a day and a year would undoubtedly show an enormous saving to the community—golden eggs indeed. This would not be the whole story, because the appreciation in real estate values due directly to the operation of the railways, as well as the benefits to business concerns as the result of bringing employees and customers to their doors, would have to be taken into account. The street railways have always put more money into the pockets of the people than they have ever taken out.

The golden eggs are worth more than the corn. The public, by constant repetition of the facts, must be made to understand this. It must be made to see how it is protected by state commission regulation from unjust charges. and why it is as necessary for street railways as for any other business enterprise to make some profit, why it is to the interest of the car riders themselves that their railways should be prosperous.

STRESS THE INTEREST OF THE RATEPAYER

This is the important point. The interest of the ratepayer must be stressed rather than that of the company. The patrons must be made to understand their true economic relation to the companies. Let me illustrate: One day I saw an advertisement in a street car. It called attention to unjust paving charges. It stated that the railway was willing to pay reasonable taxes, but asked if the car riders thought this particular tax was fair to the company. It was an appeal for a square deal, but I imagine it received scant attention from the average street car patron. His attitude would probably be: "I should worry about any injustice to the street railway company on account of taxes. I have enough of my own to bother about." Perhaps he might go so far as to say: "I am glad of it. I wish the railway taxes were higher than they are and that there were more of them." The trouble with advertising of that kind is that it does not make the rider see his own interest in the matter. What happens when the company is required to do this paving? In one Pennsylvania town the company was forced to pave the highway from curb to curb. In the city of Rochester, N. Y., 56 per cent of the street area on streets on which the cars run is paved by the railway company. If there were no railways on these streets the cost of this paving would be assessed against the abutting property owners, where it belongs, as it is their property which is directly benefited and appreciated in value. The upkeep would be assessed against the city at large, because it is the general public that uses the pavement. But in addition to making the street car riders pay for the paving, they are often charged something in addition for using the pavement they have paid for.

Why, then, not point this out? Instead of asking, "Is this fair to the company?" why not ask, "Is this fair to you, Mr. Ratepayer? Do you want to pay somebody else's assessment, or any portion of it? How do you expect lower fares if you are forced to pay somebody else's taxes? Why should you pay for the use of the streets when the fellow who owns an automobile uses the streets without charge?" Why not say: "The company is making this fight for you, Mr. Car Rider." I mention this because I have seen both kinds of appeals to the public, the one emphasizing the interest of the company and the other, as it should, the interest of the ratepayer.

The jitney question should be discussed in the same way. The public must be made to understand that automobile competition with street railways when prohibited is not prohibited primarily for company profit but for the profit of the street car riders.

SAME PRINCIPLE APPLIES IN WAGG DISPUTES

Perhaps nothing engenders more hostility against the companies than wage controversies with their employees, followed by a strike. The car riders themselves almost always side with the strikers. The politicians are in the same camp. Whatever the merits of the controversy may be, the patron of the railway must be made to see that the strike is really against them and not against the company, because it is the car riders who pay the wages. If the claim for the increase is just, well and good; the riders must be made to see that under state regulation, assuming an efficiently operated railway, they are the ones who must remove the injustice by any necessary increase in fares. If the claim for higher wages is unjust, let the riders understand that the company, in resisting, is acting in their interest. This is what I mean by stating that the true economic relation of the ratepayers to the companies must be emphasized.

Finally, if a cordial attitude of the public toward its railways is to be secured they must be kept beyond the reach of local politicians. When the railway company operating in Rochester asked for an increase of fare from 5 to 6 cents the local authorities would not allow the state commission to pass upon the question. They succeeded in getting a court decision that the commission was without jurisdiction. Then the city entered into a service-at-cost contract with the company in which the fare was fixed at 7 cents, but provision made for a sliding scale of fares and dividends. This was probably a good contract for the city. The city has a representative called a Commissioner of Railways to look after its interests. But certain newspapers, politicians and others refuse to let the company and the contract alone. They have demanded that the Legislature set it aside, and they are now demanding a new valuation. We have had one municipal campaign in which street railway issues were involved and we shall have more, with the result that undeserved animosity will be stirred up against the company which it will be very difficult to remove. State regulation is not perfect, but it is much better than this.

In conclusion, it should be obvious that no one suffers more from an unfriendly attitude toward the railways and the failure to understand the simple economic laws involved than the public itself. The ratepayers lose by it in the long run. Nothing is gained by killing the goose that lays the golden eggs.

*Utility Regulation in Ohio**

By Charles C. Marshall

Member Public Utilities Commission of Ohio

IN OHIO the regulation of railroads has existed for many years, but the regulation of public utilities began in 1911, when the first commission act was passed. In 1913 the present law was passed, and while this law was being shaped into form by the legislative committees many theories were presented to the General Assembly, resulting in a compromise bill being finally passed. This was due to the fact that the balance of power in the Legislature rested with the large city delegations that were holding out for a law reserving to municipalities the right to fix utility rates and the regulation thereof, with no right of appeal to a state commission. On the other hand, there were those who believed that the utilities were creatures of the state and that the reasonableness of their rates, adequacy of the service rendered by them and the general supervision thereof were of state-wide importance and that they should be regulated by a state commission. The result was a utility law vesting certain general powers of supervision and regulation of certain utilities in the state commission, but reserving to the municipalities the initial rate-making power with appellate jurisdiction in the state body.

We found at the beginning of the war period most of our utilities bound by rates fixed by municipalities, in most cases for a term of years covering the entire war period and longer, and because of the increased cost of labor and material many of them were unable to secure additional capital to make necessary betterments to their properties to enable them efficiently and adequately to perform their public obligations.

The Supreme Court of Ohio has held that the Public Utilities Commission does not have power to alter or revoke any contractual relations existing between a public utility and a municipality. I am not censuring the court, for I think that is the law in Ohio, but I believe that the State regulatory body should be vested with the power to change rates to meet fluctuating economic conditions and thus insure a proper return to the utilities at all times, and adequate service to the public. This is as important to the public as it is to the utility, for without an adequate return efficient service cannot be rendered.

C. C. Marshall

REGULATION BY STATE COMMISSION BEST

Under the old order of things, municipal politics were controlled by bosses, who compelled the utilities to "pay the freight" necessary to carry the political machinery, and if the utility refused to be bled, its rates were so reduced that its service was inefficient, and the public suffered no less than the utility. In many of our municipalities an organized minority which wants to make the utilities a political football in every municipal election is still able to elect agitators as members of Council and thus inflict great injury upon both the utilities and the public they serve.

The system that permits of this form of regulation is faulty, is wrong. The fixing of the initial rates to be charged for a utility service by a Council composed of men elected by the people who pay for the service to be rendered and who have no facilities for ascertaining the facts on which to base a proper rate is like placing a man on the jury to try his own case. The remedy is to vest that power in a body of disinterested men where such disputes may be settled strictly upon the merits of the case.

Another great benefit resulting from commission regulation in the matter of rate controversies is the intelligent ascertainment of the proper rate to be charged, which intelligence can only be acquired by a governmental body equipped with an available trained staff of engineers, qualified in their respective lines properly to value the property of the utility. This kind of an organization, of necessity very costly, can profitably be maintained by the state to the benefit of all, while it is out of the question for each municipality to maintain or in many cases procure such services, due to lack of funds.

One of the most beneficial results of commission regulation is the authority vested in our state commissions to supervise and regulate the issuing of railroad and public utility securities. Since this supervision has been vested in the state commissions, at least in Ohio, the great majority of investors no longer have the fear of "watered stock and bonds" that existed when the issuing of railroad and utility securities was a matter vested solely in the officers of the railroads and utilities.

From the best obtainable statistics on Jan. 1, 1923, the amount of capital investment devoted to giving Ohioans gas, telephones, electricity and electrical transportation was $1,002,500,000 and the resident investors in such securities numbered 150,000.

STATE CONTROL OF MONOPOLY

I am a strict believer in the protection of honest effort and honestly invested capital of our railroads and utilities, by vesting authority in each state commission to compel any railroad or utility desiring to enter any territory already occupied by a railroad or utility giving adequate and efficient service to secure a certificate of public convenience and necessity, after public hearing of all the parties interested. In Ohio we have progressed to the extent that the Legislature has passed such laws applying to telephone and motor transportation companies operating on our public highways, but as to other utilities that does not apply.

I have heard the claim many times in my official career that the "certificate of public convenience and necessity law" created a monopoly, but I have seen many cases where utilities have been occupying certain municipalities or territories giving efficient and adequate service for reasonable rates, and new operators have come in and been granted franchises to enter and serve the same territory, thus creating unfair competition and eventually causing both companies to fail, depriving the public of any service. Little by little the thought has got into the brain of the public that the word monopoly isn't such a desperate word after all, and it is slowly but surely arriving at the conclusion that it is the sufferer by this form of competition, and, further, that the way to get the best service at the lowest rates is to have a monopoly in the territory where the utility operates and then strictly regulate its service and earnings.

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*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

In 1922 the city and suburban electric companies of Ohio carried 735,138,200 passengers and had an invested capital of $413,789,062, while the interurban companies carried 215,497,586 passengers and had an invested capital of $215,331,365. Those combined companies paid nearly $6,000,000 taxes.

In 1921 the operating revenues of these Ohio interurban railways were $24,097,851 and in 1922 $20,234,484, or a decrease of 16 per cent.

I am convinced that these companies are trying to meet their competition in the wrong manner. In many instances they are giving too much passenger service and neglecting to secure their share of the freight business that is justly due them. If these companies would develop the less-than-car-load freight business and operate only the number of passenger cars necessary to give adequate service, I am sure the increase of revenues will put most of these companies comfortably on the black side of the ledger.

The trend of the times is toward public utility regulation; it will progress; no man or set of men can stop it. Let us adopt progress in public utility regulation as our watchword, and be ever vigilant in reaching the coveted goal of full, fair and faithful service to all, at remunerative rates.

*Wisconsin's Policy and the Milwaukee Franchise**

By *Lewis E. Gettle*

Chairman Wisconsin Railroad Commission

EVERY municipality of considerable size has had its "traction question," which has been an inexhaustible source for political platforms for local congressional or even statewide contests. For half a century aldermen, mayors, legislators and governors have ridden into office on the waves of righteous indignation or perhaps ignorant prejudices directed against "traction interests." This sort of war still goes merrily on in some of the greater cities. The contest is generally bloodless, but often vast reservoirs of lethal gas are liberated and directed toward the enemy.

In our own state the financial struggle of most street railways and a great many interurban companies to give a reasonable minimum of service has been so intense that public sympathy and concern for the continuation of service have replaced much of the former intense antagonism. The commission in Wisconsin has promoted and fostered a better mutual understanding between companies and the public. Wherever it could possibly do so, the commission has approved economies of operation. In numerous smaller cities one-man car operation has wholly replaced the two-man car. Where there has been such substitution shorter headway has been provided and safety regulations have been stiffened. Such substitution has elicited various degrees of violence in opposition, mostly founded on suspicion, pride or prejudice, but after fair trial and after the public has understood the situation the substitution in question has received at least tacit approval.

In several cases the Wisconsin Commission has given expression to its conviction that the street railway cannot be supplanted by other modes of transportation, at least for many years, and that as competitive forms of transportation invade the normal revenues of the street railways public requirements for special drains on the companies' revenues should be discontinued or lessened. To this end the commission has gone to the length of straining its probable legal rights and prerogatives in ordering extension of lines and service thereon, against the vigorous protest of the companies concerned, but only on condition that the municipal councils would as condition precedent to the effectiveness of the orders relieve the companies of paving requirements which the cities might insist on being fulfilled. We believe that neglect to provide adequate intraurban transportation is a sanitary and social error the responsibility for which in the absence of a return to the company such as will attract capital necessary for extensions of service rests in part at least on the municipality itself. Undue residential congestion, the denial of play space, fresh open air, gardens and flowers to the teeming childhood of our fast-growing cities, borders on cruelty ,if not criminality. In this connection may I say that motor vehicle passenger transportation should be permitted and encouraged, not as a substitute for street railway service but as auxiliary and supplemental thereto. Electric railway service must continue to constitute the primary mode for rapid passenger traffic, on the cheapness and efficiency of which the public health, happiness and social welfare of the great mass of workers of moderate incomes so vitally depends.

If there were time I should like to tell you of a most interesting experiment that is being undertaken in our largest city. In brief, after years of the usual acrid, bitter warfare between the people, politicians and the traction company at Milwaukee a committee of citizens representing various shades of political affiliation, and acting in behalf of the mayor and council, under sanction of legislative acts, was met by representatives of the company and after more than two years of intense study and conference, with the aid of experts, a proposed "service-at-cost" contract has been worked out. This proposed contract covers the numerous fundamental questions which erstwhile furnished the battleground of non-co-operative operation. The management of the properties remains in the company until the city elects to purchase, but the city prescribes the quantity and quality of service and agrees to rates affording revenues equivalent to the cost of service. The city is also permitted to participate in the financing of the properties.

The outcome of this businesslike effort to substitute a fair and honorable solution of traction difficulties by mutual contract and co-operation, in place of destructive antagonism, may point the way out of the disgraceful episodes which have so generally characterized relations of traction interests with municipalities.

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

*Commission Regulation Not Court Trial**

By *William Milnes Maloy*

Chairman Public Service Commission, State of Maryland

W. M. Maloy

I THINK it is a very good thing for the electric railway industry that you have a group of commissioners meet with you. It can do nothing but engender confidence on all sides. This procedure is right in line with the policy which I have always felt desirable and valuable in conducting the Maryland commission, which is that all activities of the commission are conducted with fully open doors, everybody having facilities at all times to know the full procedure and activities of the commission.

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The point I am particularly anxious to make is that it is desirable, in fact necessary, that we confine ourselves to first or basic principles in consideration of commission regulation. It does no good to blind ourselves to the fact that commission regulation has not in all cases been completely successful, although there is no doubt that much progress has been made. The reason it is not successful, as I see it, is that in too many cases the commissions themselves have conducted their affairs more on the basis of courts than of commissions, and more frequently, even when the commissions would do otherwise, the litigants, company and public, both forced the commission into a court procedure of making a record on the theory that this record is to be carried to a superior court. This makes nothing but a magistrate's court out of a commission, in practice, and thus militates against the realization of the benefits to the public which were anticipated when the commissions were organized.

I used to be a legislator and was chairman of the corporations committee and introduced the first commission law in the state of Maryland. I had high ambitions as to what the commissions would be able to accomplish. I saw first hand all the old experience and habits of lobbying, the politicians' attacks upon public utilities; I saw the futile attempts of the legislature to be a fair rate-fixing body. I also saw courts trying to settle utility affairs by court procedure according to law. When we enacted the public service commission bill I had high hopes that there would be set up a commission of high-calibered, courageous, capable men, respected by utility and public alike, who would be able as a strong administrative body, with delegated legislative rate-fixing powers, required to adopt judicial procedure to satisfy constitutional requirements as to due process of law and to consider utility regulatory problems and decide them on a business basis to the best interests of the public, whose creature they were.

I must say that my experience as a commissioner, not merely from the Maryland experience, but from watching commission regulation practices all over the United States, has been a disappointment to a certain degree on account of the point I emphasized above, that the commissions have been forced too much into court procedure. We have tried in our humble way in Maryland to follow the program according to the lines I believe in, but there are limitations not so much in the law creating these as in the public and utility attitude toward us, and I speak of commissioners in general on a national basis, which limitations have militated somewhat against our most effective work as commissions.

I would not leave you with the opinion that I feel we should abolish commissions and resort again to court and legislature control of details of utility regulations—far from it. What I do wish to leave with you is that commissions as such must be raised in the estimation of both the utility men and of the public; they must be given, by general consent, the status of a real administrative commission, for the regulation of utilities, not for their management, but for their regulation, so that there will be attracted to a commission men of the highest caliber, courage, training, ability and knowledge, whose regulatory decisions will be accepted on account of their inherent constructive merit.

*Progress Made Since the Report of the Federal Electric Railway Commission**

By Charles E. Elmquist

Formerly Chairman
Federal Electric Railway Commission

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Charles E. Elmquist

Work of the Commission Has Been Fruitful of General Improvement in the Electric Railway Situation—Favorable Public an Absolute Essential to Financial Success of Railways

A MORE friendly attitude concerning fares, paving requirements, new construction and curtailment of service became manifest after the Federal Electric Railways Commission hearing and report. The general public was convinced that an electric railway could not meet the appalling increase in the cost of operation without receiving more money for its services, and that the inflexible nickel fare and term contract were injurious to the industry and positively harmful to the public. Relief was given to more needy companies, and the emergency was safely passed. The industry now shows substantial, and I hope permanent, improvement.

The commission was instructed to "study and report upon the entire problem in order that the state and municipal authorities and others concerned may have the benefit of full information and of any conclusions and recommendations that may be presented." This injunction was obeyed and our report contained twenty-two findings and recommendations. Among these, and certainly the most important, is:

> The electric railway is an essential public utility and should have the sympathetic understanding and co-operation of the public if it is to continue to perform a useful public service.

This is not open to debate. The uncontradicted evidence as well as the experience of seventy-five years testify that the electric railway is the safest and most economical and useful and convenient means of transportation now available for moving the maximum number of people through the streets of our cities, and that no vehicle has been found to take its place.

Its essential feature being universally recognized, it remained for the industry to ascertain how to secure the sympathetic understanding and co-operation of the public. This was largely accomplished through publicity carried on by your committee of one hundred. Our findings and conclusions were used very effectively, and I think it can be truthfully said that the problems of the industry are better understood by municipal and state officers and the public than they ever have been in the past. There is now a frank recognition by the public that the electric railway is entitled to reasonable dividends upon capital honestly and prudently invested in properties which are efficiently and economically managed. This involves the admission that revenues can only come from services performed and that the charge for that service must be flexible enough to meet changes in operating and economic conditions, and that as a matter of fact, a fare of 4, 5, 6, 7, 8 or 10 cents may be just and reasonable according to the circumstances of each particular case.

My former associates were invited to express their opinion upon the outstanding results of the investigation conducted by our commission. Their answers are worth quoting in full:

Philip H. Gadsden says:

> Outstanding results from electric railway report are more intimate knowledge on the part of the public of the problems of the railways and the keenest sympathy with their difficulties brought about by the policy of frank and full publicity recommended by the commission. Except in one or two exceptional instances public attitude toward

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*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

> private operation has been strengthened by commission's report. The railway situation generally is very much better in every way than at the time of our investigation. The most gratifying phase of the situation is that there is a rapidly growing appreciation on the part of railway men themselves of the findings of the commission and an increasing effort to put them into practical application.

C. W. Beall says:

> The hearings and report of the Federal Electric Railways Commission had the very good effect of continuously impressing the public and authorities and press with the direful plight and unfair conditions surrounding street railways at that time. Undoubtedly this had considerable effect in succeeding years in helping street railway companies to get higher rates and more reasonable conditions of operation. Undoubtedly the hearings and report had a beneficial effect upon refunding of old issues and sale of new issues for construction. They were very helpful in securing increased rates of fare and more favorable conditions for many street railway properties, without which they would not have been able to refund or raise new money. The street railway situation in general is very much better now than in 1919 and 1920 as most companies have received increased rates of fare and better terms from the public authorities. . . . The greatest trouble is that in a number of cities the public and authorities are still trying to have both jitneys or buses and street railways.

Louis B. Wehle says:

> The Federal Electric Railways Commission report seems in the emergency to have facilitated friendly adjustments with the public about fares and the burden of street maintenance, but perhaps because financially relieved since 1919 by higher fares, the industry has not been impelled to follow the commission's chief suggestions that it face constructively its problems of overcapitalization and that it adopt a sound long range policy of valuation to insure earnings of its junior securities against periods of price depression. This still stands as the commission's challenge to the real financial staesmanship in the industry.

Reference will be made to the finding of the commission, which deals with the subject of credit. It reads:

> The electric railways industry as it now exists is without financial credit and is not properly performing its public functions.

That is not true at present. The general improvement in the industry has largely restored public confidence and well-managed companies now experience slight difficulty in securing capital for refundments or for new construction. Approximately $350,000,000 of new money has been expended for additions and betterments since 1919. Although this is far below actual requirements, it should be borne in mind that in 1920 the cost of labor and materials were so high as to practically prohibit construction, and that in 1921 the bankers were exerting themselves to curtail loans, and of course the railways had not begun to earn enough in 1919 and 1920 to permit of large expenditures for new construction.

Other findings to be discussed in this paper involve rates and valuation, and since they concern one general topic they should be read together. The findings read:

> Unless the usefulness of the electric railways is to be sacrificed public control must be flexible enough to enable them to secure sufficient revenues to pay the entire cost of service rendered, including the necessary cost of both capital and labor.
>
> There can be no satisfactory solution of the electric railway problem which does not include the fair valuation of the property employed in the public service, and where that is done the companies should voluntarily reduce any execessive capitalization to the basis of such value.

Since the adoption of this report the 5-cent fare has become practically extinct, except in the city of New York, and contract fares are now regarded as objects of curiosity. Substantial progress has been made in placing the industry on a sound and healthy basis. Service-at-cost franchises are being used in fifteen cities, and the question of its adoption is under consideration in Milwaukee, Akron and Winnipeg. Indeterminate franchises are recognized by law in six states and the District of Columbia, the states being Wisconsin Indiana, Minnesota, Massachusetts, Louisiana and Michigan. In the following states the power of regulation has been transferred to public service commissions, to wit: Arkansas, Louisiana, Minnesota, South Carolina and Tennessee, and in Alabama powers of the commission were greatly extended.

Approximately 600 miles of new track has been built and about 1,534 miles abandoned, showing a net loss of 934 miles, but in connection with this statement it is to be observed that about 1,500 miles of bus routes are now operated by electric railways. This new departure in auxiliary railway service has developed since 1919 and represents the substitution of more economical service for the tracks that have been abandoned. This practice is in harmony with the portion of our report which reads:

> That street railway service and jitney service cannot permanently exist and pay their own way in competition with each other under any ordinary urban conditions seems to be well established by experience and by the conditions inherent in local transportation service, but the belief is general that the motor bus may properly be used to supplement the service rendered by the street cars.

The use and development of the motor vehicle surpasses the wildest imagination of its early promotors. An article in the October issue of the *Geographic Magazine* gives the number now in use as 13,000,000, or one to each seven persons in the United States, carrying about 32,000,000 people each day, and costing for purchase and maintenance about $7,000,000,000 annually. Claims are being made that the saturation point in the country is 18,000,000, and as the average life of a machine is six years it will be necessary to construct 3,000,000 annually for replacements, that being the present production of our factories. One would be inclined to say that the vast army of machines carries daily and annually far more people than the street and electric railways, but a simple calculation proves that the service is given to about the same number.

This competition is formidable and shows no signs of diminution. Direful predictions of financial catastrophe seem to leave no impression upon the public mind and the riding habit goes merrily on, and most likely it will continue with unabated frenzy until some unusual economic upheaval brings to us once again an era of thrift and economy when a dollar saved will be regarded as more valuable than a dollar spent for gas. I own a car, but I walk part way to the office and take a street car the rest of the way, and always ride home in one. I confess my utter inability to understand the mental slant on the fellow who drives to his place of business and loses a lot of time and patience in locating a parking place on a busy street in front of a valuable property which he expects his car to occupy all day long. Parking space has reached the point of saturation in most of our cities, and this holds out a gleam of hope for the street railways. Would it not (and this thought is casually expressed) be a good thing to start a campaign of education on the relative expense, time consumed, convenience and general utility of the street car as compared with the automobile, and endeavor to convince the car owner that it would be greatly to the interest of himself and the public to patronize the street car morning and night?

Testimony submitted at the hearing by witnesses from Cincinnati, Pittsburgh, Boston, St. Louis and other cities, also by regulating officials and certain representatives of the industry, all lead to the conviction that no satisfactory solution of the problem can be reached unless the value of the property is fixed, and that the capitalization should be reduced to the basis of the value. In one large city, for example, two strikes occurred in as many months, but wages could not be advanced without an increase in fares, and the community opposed higher rates because it was known that the company in an early day had issued one share of stock as a bonus to the purchaser of each bond. Bonus or "hope stock" did not bring a dollar into the treasury. These practices flourished in the early days of electrification of street railway properties, when the valuation of the physical properties for rate-making purposes was not given any consideration.

It is quite obvious that promotion stock has now found its way into the hands of innocent purchasers for value, who expect dividends although the capitalization may be greater than the fair value of the property, and that is precisely the one thing the community objects to.

A striking example occurred in the Minnesota Legislature two years ago. The street railway interests sought to transfer to the state the jurisdiction over rates, accounting and valuation. Municipalities objected and the bill was bitterly contested. The Minneapolis franchise would have expired by limitation in 1923 and it was felt that a new franchise would be blocked by the Socialist members of the Council, who wanted to force public ownership upon their terms. Arguing the question before the joint committee a prominent Socialist referred to the question of watered stock and gave figures showing varying values of the property, as follows:

A Socialist group	$11,000,000
A citizen's committee,	15,000,000 to 19,000,000
Mr. Pillsbury, an engineer	24,000,000
City engineer	26,000,000
Company	35,000,000

Here was a spread of $24,000,000, 6 per cent of which is $1,414,000, and it would take 23,280,000 revenue passengers at a 6 cent fare to produce that money, and this figure omits any reference to the added cost of handling these passengers. It is obvious that some of these figures are wrong, and it is also evident that the public will not be satisfied that it is paying no more than a fair and remunerative rate until the value of the property has been fixed by some competent tribunal.

PUBLIC OPINION MUST BE FAVORABLE

The problem of the street railway is largely a psychological one, and influences will be at work against the public acceptance of increased fares so long as there is a belief that companies are overcapitalized and their values too high. No class of utilities is so wholly dependent upon the good will of their patrons as the street railways. People must have water, fuel and light, they must have food and raiment, but those who patronize the railway have the alternative of walking or of riding in buses or their automobiles. Therefore the railways occupy a different relation to the public than steam railroads or any other classes of utilities. It is not sufficient for them to win the judgment of the regulating commission and the courts; they must reach the bar of public opinion, and this is hard to reach and hold so long as wide differences exist in respect to value and excess capitalization.

The evidence overwhelmingly supports the conclusion that the proper solution of the street railway problem under private control depends upon the introduction of proper regulatory methods, followed by the correct valuation of the property and readjustment of capitalization when too high, and surrendering existing limited term franchises for indeterminate permits to be issued by the state. In determining the proper method of regulation consideration must be given to the industry as it now exists as well as to its normal and natural development. The companies operating within and between a large number of cities and villages cannot have as many different rates and standards of service, rules and regulations as there are municipalities served because that would intensify public sentiment against them, and also increase the cost of service. Obviously a central authority should be selected and given power to regulate rates, prescribe standards of service and accounting, determine the depreciation to be charged and probably control the expenditure of that fund, and also to prevent the issuance of securities in excess of the value of the property. Regard must be given to the strong home-rule sentiment that now exists throughout the country. People will not willingly give up the power to control utilities which so intimately affect their welfare.

Some states now have complete jurisdiction over utilities, and in numerous instances the cost of service franchises give very good satisfaction, but where legislation for the industry is necessary consideration might be given to a suggestion of this kind.

Give to the state control of those things which can be best done by the state, leaving to the municipalities the control of those things which most intimately affect their citizens. Among the powers to be given to the state is control of rates, valuation of the property, prescribing and supervising its accounting methods and controlling security issues. Municipalities should name the streets upon which the railways may operate, regulate routing and service and such matters as paving, sprinkling, the cleaning of streets and the extensions of new lines, but action should be subject to the right of appeal to the state commission in the first instance and then to the courts if dissatisfied with the order of the state tribunal.

I shall conclude this desultory discussion by quoting from the testimony of the Hon. Frederick J. MacLeod, chairman of the Public Service Commission of Massachusetts, found on page 1,438 of the printed record of our proceedings:

> Under proper public regulation dividends do not represent profits, but merely interest upon invested capital. To construct and maintain our street railway properties capital and labor are both required, and one is as essential as the other. It is just as impracticable to expect capital to be supplied gratuitously or at less than the going rate as to expect the men who operate the cars to work without pay or for less than a living wage. The man who invests his money in street railway stock is entitled to the prevailing interest rate for the use of his money equally with the man who makes his investment in the form of bonds. Indeed, in so far as the stockholder assumes the risk of having his principal impaired or entirely wiped out before the bonds are affected, he is entitled to something more than the bond interest rate. Public service companies, however, should be so managed and regulated that the risk to the investor and other speculative elements shall, so far as possible, be eliminated and the dividend return practically limited to the going interest rate. But if the possibility of speculative profit is removed it is essential that the investment be reasonably secure, or private capital will not enter the field. To sum the matter up, public service corporations do not afford a proper field for speculation or exploitation, but in order to enable them to furnish proper service and accommodations to the public their property values must be kept intact, and the payment of all costs of operation, including a reasonable interest rate upon legitimate investment, must be reasonably assured in order that needed capital may be obtained.

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*Relations of Management and Employees**

By Dr. C. A. Lippincott

Studebaker Corporation
South Bend, Ind.

Dr. C. A. Lippincott

The Basis of These Relations Should Be Maintenance of Self-Reliance—Some Welfare Methods Do Not Do This—Maintenance of Self-Respect and Self-Reliance Is Most Important to Organization Personnel

MOST of the efforts made up to this time to bring management and employees into closer relation have been made along so-called lines of welfare work. Welfare work is an expression associated largely with charitable institutions. It has been a work of philanthropy rather than based upon actual business conditions and business necessity. This work has failed to succeed largely because it was contrary to two fundamental principles. In the first place, this work has not been ethically sound, and any relationship between employers and employees must be upon a sound moral and ethical basis before it has the possibility of success or continuance.

To begin with, welfare work invades the man's self-respect and no man can afford to accept gratuities of any sort or of any kind, however valuable they may be, for he pays too great a price for them. He pays the price of his self-respect, of his independence, of his self-reliance, of his manhood. The best thing that any of us have is our self-respect, our independence, our manhood.

I am opposed to it, too, not only because it breaks down moral fiber but because it destroys that individuality which we need in the citizenship of this great country. A nation which has too much done for its people inevitably becomes a weak nation, and in the hour of crisis will fail to function and fail to meet the supreme obligation.

There is another thing about these gratuities and this paternalistic form of government and that is they all tend toward socialism, toward communism, and certainly we are absolutely and utterly opposed to the development of socialism and communism in this country. We don't believe in it; we don't want it. Our individuality is our most precious possession and that is the thing we are interested in preserving.

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*Abstract of address at annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

I am opposed to these welfare plans because they are economically unsound as well as ethically unsound.

We deal with four things in industry: men, material, machinery and methods of management. I frequently ask groups of foremen which of these four things is the most important in getting out production. I have been surprised at times to have them mention one thing and another, instead of mentioning at once that man is most important of the four in getting out production.

We have spent millions of dollars in trying to get foolproof machinery and then we have gone out to try to find a fool to run it. It must be conceded that we have had a great deal of success along that line.

Now the first step in any approach of management to men must be on the basis of justice, on the basis of simple, plain justice. Nothing can take the place of that. That is the first consideration when we come to consider the distribution of the profits, if there be any, of the joint enterprise of management and men, of capital and the public.

What is a fair distribution of the profit? What is a fair wage to the man in your employ? No man can write a universal formula for justice under all conditions. That is a problem which must be worked out in the individual industry, but the fundamental basis of our first approach to the employees must be on the ground of doing absolute justice.

The next necessity in any approach to men in solving the problem of management and men and their industrial relations is the question of attitude toward the man, of consideration for the man. I do not think that, after all, the problem that gives you the greatest trouble with your men is the question of wages or of hours. The greatest problem with the men, as I have found in the last four or five years (and I have interviewed literally thousands of workmen) is not so much the question of wages, but it is a question of the attitude of the managers toward the man while he is in their employ.

Today we are just beginning to recognize that the foreman is the key man in industry, although he has always been the key man, for whatever the managers, the presidents or the directors of the railway may desire in their attitude toward the employee, they are actually represented by what the foreman does to that employee. He is the point of contact. The foreman in the past has been largely a driver of men. His idea was to make the man go whether or not he wanted to go. I want to say to you that men all over this country today are resenting that kind of a method, and they should resent it. They are men and we want them to be men —self-respecting men. The man who can be driven is not the highest type of employee, but the man who can be directed, the man who can be led, is the man whom we want in industry today. Before we can get him, we must educate the foreman to be a director of men and not a driver of men; to be able to command, by his superior mental and moral power, all of the energy, and particularly the allegiance and co-operation of the men who are in his charge.

I believe that the employers of the United States can solve this problem of human relations if they are willing to concentrate upon it. I want to say to you, and to emphasize it positively, that the first move along this line should be made by the employer. The employer prides himself upon being the mental and moral superior of his workmen. Certainly he ought to be. Probably in some instances he may be their mental superior, though you will find many men of keen minds among your employees. But in too many instances he is not their moral superior. His principles are not as good as those of some of the men who are working for him. Unless we can take higher ground than they take, unless we can recognize that there has been a great deal of injustice in the world, and that it is up to us first of all to right that injustice, we will not remedy the situation.

"Oh," you say, "the man will not appreciate it." Suppose he does not appreciate it; he has had a great deal of training the other way. It is going to take some time to train him to realize and believe that he is a partner in the business, that capital and the employer are interested in his welfare, that they are interested in giving him justice, that they are interested in giving him a square deal, that they are interested in seeing that he has an opportunity to live as well as to let live, to live for himself as well as to live for others in this world.

That is the attitude which employment must take today. First, the attitude of justice, and second, the attitude of kindness, of a desire to treat the man who is under you, in your care, and whose destiny is largely in your hands, with kindness and to be fair and square to him under all conditions.

Does Rubber Endanger the Rails?*

By Alfred Reeves

General Manager
National Automobile Chamber of Commerce

Co-ordination of Trolley and Bus in the Field of Mass Transportation Is Urged—More than 1,000 Buses Are Now Being Operated by Railways in Auxiliary Service

Alfred Reeves

MY THOUGHT is to draw a picture of the future—a picture which, it seems to me, will have to be realized if the American public is to enjoy the transportation to which it is entitled, and purveyors of transportation receive the reward which should go to those who properly perform a service so vitally necessary as the street transportation of America's ever-increasing and ever-restless population.

It seems proper to mention that the automobile industry, and those who use its products are probably the biggest taxpayers in this country.

Last year we paid $114,000,000 to the federal government in excise taxes, while annually we pay not less than $215,000,000 to the state in registration fees, personal property taxes and gasoline taxes (the latter now effective in thirty-seven states) with $6,000,000 more in wheel and privilege taxes, or a total of $335,000,000, which will probably climb to a total of $400,000,000 in 1923.

John E. Walker, former tax adviser to the United States Treasurer, states that of the $9,000,000,000 total tax burden of county, state and nation in 1921, more than $700,000,000, or 8 per cent, came from taxes levied against transportation—motor, steam and electric.

Few will deny that the trolley supplies the best form for mass transportation. It is generally agreed that transportation in big cities can best be served by monopoly, provided that monopoly is not abused, not overcapitalized, and is properly regulated by state authorities.

Unfortunately, monopoly in transportation in the past has been abused and the public has resented it. The newspapers gained circulation and politicians have gained popularity by shouting about it.

Our industry appreciates the hardships of the electric lines. There has been legislation far beyond what seemed necessary. There has been taxation almost to the confiscation point. There have been rulings that were almost impossible to obey. During the past five years, you have also been faced with a new form of transportation, which has in some cases added to your income by increasing the number of passengers traveling, but at other times has undoubtedly cut into your earnings to a substantial degree.

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*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

Low cost has not always been the answer, because the average American is ever ready to pay extra to save time and secure comforts. This is shown by the 10-cent fare paid by 55,000,000 people last year who patronized the Fifth Avenue bus service in New York. The public, I am sure, will gladly pay 8 or 10 cents for a special bus service even when the trolley fare is 5 cents, and it should be willing to pay extra where buses and trolleys are on a transfer basis.

The private passenger car, operated by its owner on the roads which he builds and pays to maintain, is with us now to the number of almost 11,500,000.

COMBINATION OF TROLLEY AND BUS ADVOCATED

Two questions present themselves:

1. If the buses had come first, how many of them could now be supplanted by trolley cars?

2. Does rubber endanger the rails?

The bus is a member of the transportation family, born of an emergency and certain to grow into a lusty youngster. It should be adopted as an ally of the trolley, which we shall always have, because the electric lines are still the best forms for use in handling mass transportation.

With the present congestion of traffic and concentration of population, the trolleys cannot properly handle all street transportation. They cannot afford to build in sparsely-settled territories. Nor can the bus do it alone. Think how many would be required to supplant the trolleys which last year carried 15,000,000,000 passengers, which was 15,000,000 more than in 1921. A combination of trolley and bus seems to be the real answer.

In some instances it seems best for bus lines to be run independently, but in a broad sense it has appeared to us in the bus industry, that as experts the trolley people had a rare opportunity to enter the bus field and thus give the public complete transportation.

It is doubtful if the public will support bus lines conducted on a trolley basis. While not always possible to realize, the aim should be to give a bus seat to every passenger. This has been done successfully in New York, Detroit and Chicago, and we feel it can be done in other cities.

The public wants quick, safe, comfortable and economic transportation and cares not about the medium. Given the service, it will gladly pay a proper fare. The trolley company's interest in transportation lies in protecting its capital investment, securing new capital, caring for depreciation, returning proper dividends on securities, covering its general expenses, paying taxes and in meeting charges for paving between the tracks. The bus operator's requirements are about the same except as to the paving charges, but these are offset by registration fees, fuel taxes, and special impositions of one kind or another.

In certain fields of street transportation the trolley is supreme in efficiency and economy. In others the bus holds a similar position. This demands that the two forms be co-ordinated. The prime consideration, therefore, is to fix the fields of endeavor which each shall enjoy.

Many people have not appreciated that you trolley men have been taking the bus into your arms in order to round out a proper service for your communities. They express the fear that if you take over the buses, it will be for the sole purpose of bringing about their elimination. This is the one belief which the electric railway interests in this country must change if their entrance into this new field is to receive a proper welcome.

Service and not price is the real answer to transportation. The public is growing to believe that the trolley companies should manage the others, rather than irresponsible operators. But I fear they will patronize the so-called irresponsible operator if he succeeds in winning their favor by a sincere effort to give service at a low rate. By hesitating, trolley men have missed some golden opportunities, although it is not too late if they will enter the field in the proper spirit.

Most statements of electric railway men seem to hail with delight the inability of bus lines to score 100 per cent, when at short notice they have been installed in place of trolleys. I hear the difficulties of Bridgeport, Saginaw, Des Moines, and other cities; but, gentlemen, those operations were only growing pains and only partially indicated what can be done with buses. Most of these operations could not be considered conclusive measures of bus efficiency, because they were emergencies and lacked time for proper organization.

RIGHTS OF THOSE NOW IN FIELD SHOULD BE PROTECTED

May I emphasize another point?

We believe that the power of the trolleys to acquire, own and operate buses, should be exercised largely in new fields. It hardly seems equitable, except where there has been illegal or unjust competition, that they should be allowed to destroy bus transportation in the hands of others. In all cases where men have taken the risk in order to build up a bus transportation business, equity demands that they be permitted to retain that business if it is not adverse to public welfare, or that there be paid for the business a sum which is not measured by the sum of the second-hand value of the equipment, but the value of a going concern which pioneered a development that has proved of benefit to the public.

One could give a long list of happenings in this country of late that shows the tendency toward bus transportation. The most outstanding feature, of course, had to do with the operations in Newark during the recent trolley strike, where some 11,000,000 passengers were carried during August by the bus lines.

One of the largest bus operations by an electric railway is that at Milwaukee, Wis., where more than seventy-two buses are now in service. Wilkes-Barre, Pa., has bus service of from sixty to seventy-five units, handling approximately 4,000,000 passengers annually.

WEST COAST HAS 100 INTERCITY BUSES

The most noteworthy move by one company is the action of the Pacific Electric Railway and the Los Angeles Railway Corporation at Los Angeles and Pasadena, Cal.

After a survey of the operations of other electric lines and the independent bus transport service being given in all parts of the country, these two companies jointly have secured a long-term franchise for bus operation in these two cities and have placed an initial order for almost 100 buses of the twenty-five-passenger type, and their investment in equipment, garages, etc., will total approximately $1,000,000 immediately, with every prospect that this will be doubled before the end of this year.

At Baltimore the United Railways & Electric Company has been operating buses for several years, and has extended its service within the past year. At Newburgh, N. Y., and at Everett, Wash., the electric railway lines have abandoned their electric service and taken up bus operation instead. At Youngstown, Ohio, the Pennsylvania-Ohio Company now has an installation of buses totaling thirty-one, of which about one-half are of the de luxe type. Since inaugurating this service, about a year ago, the traffic on the lines, combined bus and electric service, between Warren and Youngstown, 15 miles, has increased 33⅓ per cent.

We are not yet sure of the proper types for the various kinds of bus service. Some bodies have been built entirely too wide and without respect for the rights of others on the highway.

We feel our industry is in accord with yours, so far as it relates to state supervision of common carriers. More than two years ago, we declared that control over motor vehicle common carriers, if deemed necessary, should be placed in existing state commissions and that as a prerequisite to operation the owner should be obliged to obtain a certificate of public convenience with the proviso that lines in actual operation shall prima facie be regarded as necessary.

Our declaration called for liability insurance, with special or extra fees utilized for highway maintenance, and advocating legislation to enable steam railroads and trolleys to own and operate the motor vehicle in conjunction with their regular line of business.

My faith in the good sense of American business men, together with your kindly reception of a representative of the automobile industry, leads me to believe that this meeting marks a new era in local transportation in this country.

American Association Proceedings

Growth and Development of the Industry Are Shown by the Scope of the Papers and Discussions —Among the Broader Questions Considered Are Valuation, Taxes, Commission Regulation and Co-ordination of Transportation Facilities

THE opening session of the American Electric Railway Association was called to order at 10 o'clock on Tuesday morning by President C. D. Emmons, president United Railways & Electric Company, Baltimore. Before the president had proceeded far into his address the meeting room was well filled with an enthusiastic audience. President Emmons' address appears on another page in this issue.

In reporting for the executive committee, Executive Secretary J. W. Welsh said that this report consisted of a review of the several executive committee meetings during the year. This was received and will be included in the records. Mr. Welsh gave a brief review of his own report as follows:

Reports of Secretary and Treasurer

He stated that the association year, which comes to a close with this convention, has been one of growth and development in various activities. Possibly the most noteworthy work done has been that of the information bureau. A total of 11,812 requests have been answered during the year, an increase of approximately 16 per cent over last year, and greater than any previous year in the association's history. Of the member railway companies, 81 per cent are consistent users of this service. The need for it is self-evident, as it is a clearing house for information through which companies may secure at one central point information which would otherwise require communicating with a great many companies.

Mr. Welsh pointed out that it is now generally appreciated that the association maintains a complete, up-to-the-minute file on problems of major importance, such as wages, relations with labor, fares, commission regulation, financial statistics, etc. It may not be generally known, however, that a much wider range of subjects is constantly in review and under investigation by the association headquarters staff. As examples, he cited the statistical information relating to motor bus operation, now of great interest to every electric railway company. A notable report issued by the bureau covered a summary of. public utility laws throughout the country. This is the only report available on this subject from any source made during the last ten years, and the need for it has been clearly indicated by the fact that copies have been requested not only generally throughout our industry but by public libraries and other national organizations and the public utility commissioners themselves.

The services of the advertising section have been taken advantage of by a much larger number of companies and particularly by the manufacturer members. This work is supported by the committee of one hundred, and a campaign for funds covering another two-year period was recently made and consummated in six months. Both electric railway and manufacturers are realizing the need of educating first their own employees in the problems of the industry so that they may pass the information on to railway patrons. An important activity in this direction which has been initiated during the year has been the awakening of the manufacturers to a realization of their opportunity in educational work among their own employees. The personal work of E. F. Wickwire, chairman of this committee, stands out as a real accomplishment, he said.

The secretary said that the association magazine *Aera*, has won recognition in the field of public utility periodicals, quite aside from its increasingly valued reception by electric railways. In this connection he reported that during the year an increase of 20 per cent in advertising rates became effective, and this, together with an increased use of the advertising pages by manufacturers, has resulted in a substantial increase in the magazine's revenue.

The secretary also referred in his report to the establishment of the Charles A. Coffin Foundation, which he said would serve as a stimulating influence in improving electric railway service and in broadcasting the achievements, to the end that the public generally will appreciate the efforts of electric railways toward modernizing their service and equipment.

The secretary referred to the work of the Engineering Association during the year and mentioned the complete revision of the Engineering Manual, which has been made. The work of the other associations was also touched upon, as was also that of the Washington office.

As an appendix the secretary's report contained a complete list of the membership, together with a tabulation of committees and number of meetings held by each, and a summary of the changes in membership.

Barron G. Collier, New York, reported as treasurer on the financial status of the association as of July 31, 1923, the date of the last official audit, saying that in the printed proceedings of the convention the audit of Nov. 1 will be included to bring the figures up to date. Mr. Collier said that the total revenue of the association for the first nine months of the present year were $224,180 and total operating expenses $120,813. This leaves a net income of $103,367. Deductions of $10,000 for the welded rail joint committee and $4,117 for the joint fuel committee were made from this, leaving a net surplus of $89,249. The association books as of July 31 also carry a fund of $21,542 belonging to the welded rail joint committee. This money was raised entirely by contributions to the committee by the association and others interested in its and is being handled for the committee by the association.

Mr. Collier pointed out that the surplus indicated in the above figures will be materially reduced by the end of the association's fiscal year.

At this point President Emmons appointed as members of the resolutions committee A. W. Brady, J. G. Barry and H. W. Blake.

Finance and Policy

J. H. Pardee, New York, read the report of the committee on finance, of which R. P. Stevens and J. G. Barry are also members. Mr. Pardee briefly reviewed how the committee has kept close supervision of the expenditures of the association during the year and advised with the executive secretary on all matters having to do with the handling of the association finances. He said that while the association expenditures are greater than for last year, this is to be accounted for largely through the increased activities of the association, as set forth in the report of the executive secretary. All accounts of the association have been audited quarterly by a firm of certified public accountants. Mr. Pardee said that in the opinion of the committee the financial affairs of the association are conducted efficiently and in accord with modern business methods. The committee is satisfied that the association is fully protected in all of its financial transactions. From present indications the receipts for the current year will be approximately the same as for last year, while it is expected that the total of all expenditures and contributions will approximate 25 per cent higher.

Britton I. Budd, Chicago, presented the report of the committee on policy. He said that two matters calling for action by the committee had come up during the past year. One was the proposed organization of a medical and surgical section of the association, through which physicians and surgeons employed by electric railways might exchange experiences for the benefit of the industry. After careful consideration, the committee disapproved of the suggestion. The committee felt that opportunity for exchange of ideas could be afforded through the creation of a joint committee of physicians and surgeons affiliated with the Transportation & Traffic Association and the Claims Association. This recommendation is being considered by the executive committees of the affiliated associations.

The other matter had to do with the participation of the American Electric Railway Association with other utility associations, the railroads and communication companies, in the formation of a co-operative committee to study inductive co-ordination. The committee on policies recommended that all associations participate in this study.

The committee gave consideration to the formulation of a brief statement of principles, which might be used on letterheads and in other ways. The 1914 code of principles, while excellent, is so lengthly that little practical use of it is made. The committee reported progress on this item.

The committee noted with gratification that the courts and public regulatory bodies are adopting the principle enunciated at the last convention of this association, namely, that public transportation is a natural monopoly and that the established transportation companies are entitled to public protection from competition; that is, duplicative of service, destructive of stability and detrimental to the public interests. This principle has not yet been generally adopted, but decisions in Illinois, New Jersey, Maine, Maryland, Connecticut and other states show that public realization of the essential character of electric railway service is becoming keener and the commissions and courts are reflecting this public sentiment and pointing out that when the public regulates and controls a utility it is under obligation to protect it from impairment. The committee recommended that the association reaffirm this principle and continue to assist member companies and the public with all available information regarding points at issue.

The committee said also that the association might well reaffirm its policy on public ownership. While some notable experiments have been made in this phase of socialism, the results so far obtained strengthen the conviction that the public can be better served under private ownership and operation. Our energies should be directed toward giving the public the best service possible, which is the most effective way to combat the agitation for public ownership and operation. Where public ownership and operation have been tried, the public has learned that it is not possible to get something for nothing, that the rate of fare must depend on the cost of providing the service. The committee recommended that the association continue its efforts to educate the public on this question, as the association believes the doctrine of public ownership is in conflict with the principles upon which our government is founded.

C. L. Henry, Indianapolis, as chairman, presented the report of the committee on national relations, which follows in abstract:

National Relations

As the attention of both houses of Congress was taken up almost entirely by matters of more public concern, but little transpired before any of the committees of either house that was of special interest to our industry or that called for any special attention on the part of the committee.

Britton I. Budd
President-Elect A.E.R.A.

From the present outlook, judging by the discussions all over the country, through the newspapers, in public addresses and otherwise, the coming session of Congress, which will meet in December, will consider many matters of very grave importance to our industr, as it represents a part of the great transportation industry of the country which will call for close attention to the end that the electric railways may not suffer by any legislation that may be enacted.

As heretofore in such cases, the discussions will center around the steam railroad systems of the country and whatever legislation is considered or enacted will primarily be directed toward the problems involving the steam railroads. However, as many of our companies are interstate carriers and, as such, subject to the jurisdiction of the Interstate Commerce Commission, and now subject to many of the provisions of the transportation act of 1920, which will in all probability be amended in many respects, unless careful attention is given to the matter, the electric railways in the country will be embarrassed in legislative provisions from which they should be entirely exempted.

The legislative battles will, in our opinion, be centered around the transportation act of 1920. From many of the provisions of this act electric railways are either entirely or in a measure exempted and we feel that in not a single instance should there be any change where such exemptions are written.

The Interstate Commerce Commission in its report for 1922 has recommended "that section 20-a of the interstate commerce act be amended to include within its provisions electric railway companies engaged in the general transportation of freight." This section is the one giving to the Interstate Commerce Commission control of the issuance of stocks, bonds, etc., of interstate railways and the Congress exempted electric railways from the provisions of the section.

On account of the various questions arising in such matters, the committee is very strongly of the opinion that the jurisdiction over the issuance of stocks, bonds and other securities by electric railways, should be left in the hands of state commissions instead of being placed under the control of the Interstate Commerce Commission.

Since the last annual meeting of the association the attention of the committee has been required by various matters in various forms before the Interstate Commerce Commission. It was represented at the original hearing held by the Interstate Commerce Commission to discuss the provisions of the proposed interchangeable mileage act and filed with the commission a brief on the subject setting forth the attitude of the electric railways toward the proposed legislation. The final order of the commission exempted generally electric railways, but issued a supplemental order including several electric railways which had requested to be included in the commission's original order. Before anything was done in the way of carrying out the provisions of the commission's order in the premises, the whole matter was held up by an injunction of the court and has not even yet been tried out.

In December, 1922, the committee was represented again before the Interstate Commerce Commission on the "application of the Western Pacific Railroad for authority to acquire control of the line of the Sacramento Northern Railroad," etc. This case was of importance to electric railways generally as it involved the question of whether or not the Sacramento Northern Railroad would be "operated as a part of a general steam railroad system of transportation" in the event the Western Pacific Railroad acquired control thereof. The committee supported the contention of the Sacramento Northern Railroad that it should not be properly construed as being operated as a part of a general steam railroad system of transportation.

In January the chairman of the committee, along with Mr. Welsh, secretary of the association, appeared on invitation of the commission before the Federal Coal Fact-Finding Commission and had a long conference with the commission, during which all the features of the coal situation, so far as they related in any way to our industry, were fully discussed. Of course, the commission did not make any statements which would indicate what it intended to do, but it did—all of the members—exhibit the most interested and friendly feeling toward our industry.

During the annual meeting of the association at Chicago last October the chairman of the committee was authorized to appoint a sub-committee of five to have full charge of all matters relating to the disposition of questions arising under section 15-a of the interstate commerce act, of which sub-committee the chairman of this committee was to be chairman. The chairman of this committee thereupon appointed the following persons on such sub-committee: C. D. Cass, A. W. Brady, B. C. Cobb, W. V. Hill and Britton I. Budd.

Soon after at a meeting of the sub-committee it was agreed with the Chicago, North Shore & Milwaukee Railroad that that company should prepare for presentation to the Interstate Commerce Commission a brief maintaining that the company was not embraced in the provisions of section 15-a of the interstate commerce act. As soon as this brief was prepared it was submitted to the members of the sub-committee and approved by them in every respect. At the time it was filed with the Interstate Commerce Commission the sub-committee also filed with the commission a short brief asking to join with the Chicago, North Shore & Milwaukee Railroad in the question presented by the brief, asking also, as did the railroad company, for an oral hearing on the question. Matters remained without action for some time, when the Chicago, North Shore & Milwaukee Railroad was notified by the commission that until further order it need not take any further steps in the matter. This was understood to be equivalent to a finding by the commission that the contentions of the Chicago, North Shore & Milwaukee Railroad were approved by the commission. Since that day nothing has been heard from the commission in any way regarding the status of the company under section 15-a.

As the chairman of the committee has by request of various companies been made their representative in Washington before the Interstate Commerce Commission, there have been since the last annual meeting of the association a great many communications addressed to these companies by him relating to matters before the commission, but there is nothing among them which calls for a general notice.

It should be borne in mind by all representatives of electric railway companies that the Washington office can be called upon by members of the association in all such matters and will gladly render every possible service.

The report was signed by W. R. Alberger, P. S. Arkwright, H. G. Bradlee, Arthur W. Brady, C. D. Cass, F. C. Chambers, B. C. Cobb, S. M. Curwen, J. H. Hanna, T. N. McCarter, John W. Shartel, H. B. Weatherwax and Charles L. Henry, chairman.

Reports were read of the committee of one hundred and joint committee of the national utility associations. Abstracts follow:

Committee of One Hundred

The committee reports that in accordance with a previous agreement entered into with you, it has during the past year financed the work of the advertising section of your association. Details of this work have been under the direct supervision of the association's committee on publicity, which will submit a separate report. The committee of one hundred's report will be confined strictly to the financial phases of the situation.

The fund which was raised in 1921 for carrying on the work of the advertising section was practically exhausted on Jan. 1 of the present year, so the committee of one hundred inaugurated a new campaign for funds. This campaign now is practically completed, and the amount raised assures the carrying on of the work of the advertising section at the present rate of expenditure until some time during the latter part of 1924.

One hundred and seventy of the 641 railway companies asked to contribute to this fund contributed, as did also seventy-six of the 245 manufacturer companies and ten of the sixteen associated companies. Out of a total of 902 organizations solicited, 259 contributed to the fund. The first appeal for funds was sent out on March 5, 1923, and the last contribution was received on Sept. 4, 1923.

Henry R. Hayes, secretary and treasurer of the committee of one hundred, has supervised the expenditure of moneys, and a complete record of funds expended has been received by the chairman and is on file at Mr. Hayes' office and also at the association headquarters, where it is available at all times to contributing members interested in the work.

The report was signed by Guy E. Tripp as chairman.

National Utility Associations

In the organization of this committee are represented three national utility associations, viz., the National Electric Light Association, the American Gas Association and American Electric Railway Association. Its activities are handled through the following sub-committees: Federal taxation, P. H. Gadsden, chairman; public utility fuel, J. W. Lieb, chairman; public utility financing, S. Z. Mitchell, chairman; public information, M. H. Aylesworth, chairman.

On the subject of federal taxation the committee has kept closely in touch with the proposed national legislation, particularly the movement to abolish tax-exempt securities. Early in the year a letter was sent to member companies calling their attention to the "Green resolution" for a constitutional amendment. Arrangements were made for mailing extracts from the Congressional Record containing letters from Secretary Mellon and an article by Professor Seligman to member companies. The membership were again advised when the Green resolution came before the Senate judiciary committee on Jan. 23. At the annual meeting of the Chamber of Commerce resolutions were presented on behalf of this association and the American Gas Association favoring the elimination of tax-exempt securities. As a result of this the United States Chamber of Commerce has referred the matter to its committee on taxation for special consideration. In general this committee has also had referred to it questions dealing with valuation and has a special committee engaged in the consideration of this subject.

The work of the joint fuel committee under Mr. Lieb has been completely covered in the printed reports covering the establishment of a Washington office during the coal emergency and the assistance which was rendered to all public utility companies in securing coal at that time.

The work of the committee on public utility information was carried on by co-operative action between the directors of publicity of the three national associations and by maintaining close contact with the state public utility information bureaus. The report was submitted by Randal Morgan.

J. N. Shannahan, national councillor United States Chamber of Commerce and president Newport News & Hampton Railway, Gas & Electric Company, praised the work of the national chamber and urged all to take an active interest in its work. The more railway men, he said, who attend its annual meeting as national councillors or delegates from their local chamber the better.

TRANSPORTATION NEEDS

P. H. Gadsden, United Gas Improvement Company, then gave an oral report of the study of transportation now being conducted by the United States Chamber of Commerce. He said that in January of this year, following a conference called in New York by President Barnes of the United States Chamber of Commerce to consider the subject of transportation, it was decided that the national chamber should make a study of all transportation agencies through five committees. These committees are, respectively, on (1) the relation of the railroads to government, (2) consolidation of railroads, (3) rates, (4) relation of the motor truck on highways to other forms of transportation, (5) water transportation. Of these committees, electric railway companies are interested particularly in committee 4. This committee, of which Mr. Gadsden is a member, soon found that the basis of the question being considered was regulation. The steam railroads and the electric railways were operating under regulations imposed by statute, and it was necessary to know what position the people of the United States wanted to take in regard to the regulation of the motor truck. Hence, a sub-committee on regulation was appointed, with Mr. Gadsden as chairman, and while the speaker could not give the conclusions reached by that committee, he was permitted to say that the representatives on that committee of the motor truck interests had shown a willingness to approach the subject of motor trucks when engaged as common carriers in a spirit of co-operation. The next step was to investigate the subject of taxation, not only from the standpoint of the amount of taxes assessed on the property values of each industry, but also the extent to which each of the carriers was being required to act as a tax collector. As regards this latter requirement, the speaker said that the electric railways led all the others. He also spoke of the very valuable assistance given to the committee.

The work done by all the various committees is now complete and their reports are in the hands of the president of the national chamber. The next logical step would be the appointment of a general committee by the chamber to consider these reports and prepare a report representing the mature judgment of the people of the United States.

Without attempting to forecast in any way what this report would be, the speaker felt that he could say that he believed it would be of great value to the industry in clarifying the proper position of the different transportation agencies. It would not be prepared with the idea of defending or supporting any particular interest, but absolutely with the purpose of determining which system or combination of systems was best for the people of the United States. From that standpoint the electric railways have nothing to fear.

At the conclusion of Mr. Gadsden's talk, reports were presented by the committees on trackless transportation, uniform motor vehicle regulatory laws and construction and maintenance of highways for motor vehicles. These reports follow in abstract:

Trackless Transportation

The experience of the industry during the past year has been to confirm the findings of the committee contained in its 1922 report.

The answers made to the questionnaires sent out this year by the committee of the Transportation and Traffic Association indicate that the adoption of bus service by electric railways has been of a character and for the reasons set forth in our 1922 committee report. This experience in general confirms the fact that bus operation is on the average more expensive per bus or seat-mile than electric car operation, but that the higher unit cost is justified where traffic is very light.

The committee's conclusion last year that "the possibilities of development of transportation with railless vehicles should interest the industry greatly" has been justified by the fact that in the intervening year (from June, 1922, to June, 1923) the number of electric railway companies to adopt buses for part of their service has increased from forty-four to ninety-five and the number of buses involved from 300 to 925.

The committee on bus operation of the Transportation and Traffic Association has prepared an excellent report this year, giving the results of a study of the extent, costs, reasons for and methods of bus operation by electric railway members of the American Electric Railway Association.

It is believed that the same social and economic forces which have already caused the adoption of auxiliary bus service by ninety-five electric railways in this country will continue to expand their use in the future and that the association should arrange for the coming year to continue the study of the operating, engineering and accounting details of bus service.

The constantly growing use of bus service by electric railway companies gives this association a direct and vital interest in the questions of special taxation and traffic regulations affecting motor vehicles in general. In this connection co-operative action with the automotive vehicle associations is desirable.

Another feature which should be of interest to the association is the provisions of state laws and the attitude of state commissioners as to the regulation of competition with electric railways or the operation of buses by electric railways.

In its last report the committee stated in substance that there was a field for the economic use of buses to supplement the electric railway service in the cities of this country, either by inaugurating bus service on lines of light traffic, where track reconstruction was the other alternative, or by using buses for extending service into new territory where the expected traffic was not great enough to warrant the investment in tracks for railway service.

The committee also concluded that for handling mass transportation the electric railway is the most reliable and economical method now known, but that on account of the availability of buses for the special conditions above stated, the electric railways should be alive to the possibilities of bus operation—both in order to handle all the transportation needs of their community and by so doing to prevent wasteful competition by others entering the field due to the electric railways failing to utilize buses where the need for them exists.

Experience has shown that the motor bus amalgamates well with street railway transportation. It decidedly helps in providing a unified service in which the various companies are trying to provide street transportation. The menace of the jitney, although still present, has grown less. Particularly has it become apparent during the past year that after the street railway has installed motor bus operation the public has come to realize how much more satisfactory is the service than that previously rendered by various irresponsible, poorly organized jitney companies.

This has been largely due to the adoption by the street railways of the best constructed and designed buses to be found on the market. They have been well maintained, cleaned, painted and run on schedules of frequent and evenly spaced headway from early in the morning until late at night. All this has been a welcome change in many communities.

The automotive industry has progressed in the past few years and is now developing passenger carrying vehicles of improved design. We are advised that the larger manufacturers of buses have appropriated large sums for the further improvement of bus design for passenger transportation service. There is a field in transportation in which these vehicles can furnish satisfactory service and traction officials should not allow an antagonism, aroused by jitney competition, to cause them to lose sight of the fact that it is their duty to supply transportation in the territory in which they are operating, and if extensions are required or present high costs of reconstruction necessitate the abandonment of any track, they should be quick to consider trackless transportation. The electric railways must keep pace with the development in the transportation field if they expect to continue to be the recognized distributing agency of the transportation commodity in their territory.

Failure on the part of traction companies to recognize and meet the above described situation will result as it has in the past in encouraging independent operators to enter the field and meet these service requirements. It is better for the traction companies and the public to realize fully that duplication of service is detrimental in that it results in a higher cost for transportation, making it desirable that the traction companies shall remain the transportation agency of the community, giving the public what it wants if the request is reasonable and the need apparent. Duplication of service is always ultimately paid for by the passenger and under proper regulation it is to the interest of the passengers that highway transportation shall be conducted as a unified whole.

From the results of experience in operating trackless transportation so far it must be appreciated that higher operating costs per seat-mile with buses justify a higher rate of fare in proportion, in compensation for any expedited service which may be possible by their operation.

Transportation is lacking in some places where lines have been abandoned on account of high costs of operation or of track reconstruction. The public formerly served by these lines feels that an injustice has been done the communities. Not only where lines have been abandoned but also in many local and country sections where highway transportation has never existed there is a growing demand for some service, and this demand is constantly increasing where communities are stretching out into new territory and going through a process of natural growth. As the recognized distributors of transportation, the traction companies should be prepared to supply this lack. It must be realized, however, that it is incumbent upon sparsely settled districts to assist by caring for deficits until the service becomes self-supporting. Never again must the transportation companies and the riding public, who eventually pay the bill, be imposed upon for the purpose of land development exploitation.

The committee has five members who have served at least two years and whose companies are in the business of operating motor buses. In fact, of the thirteen members, ten represent organizations that have inaugurated motor bus operation.

The members of the committee are convinced that the motor bus has come to stay. It is a business proposition, not a theory. In fact, the use of buses where feasible is an established policy with most of the members of this committee. Committee reports have been made in many associations of street railway men and in the automotive industry. Technical journals have compiled statistics of every description. Two conclusions seem to be reached by reading these data and these reports, and from the committee's experience:

1. The electric car running on rails is still the most essential, reliable and economical method of urban, suburban and interurban travel, considering the transportation problem as a whole and especially for mass transportation. This condition arises largely from the fact that the operation costs per passenger are higher for bus operation than with electric cars, and from the further fact that it is not possible to handle mass transportation with buses.
2. The motor bus is needed to feed and supplement our car lines, to open up new territory; in fact, to complete, round out and make whole passenger transportation on the highway.

As stated by this committee in the past, it is our duty, as public servants charged with the responsibility for conducting the highway transportation in our respective communities, to adopt every feasible unit or method for furnishing this service.

The report was signed by J. H. Alexander, R. E. Danforth, B. J. Fallon, George Keegan, T. J. McGill, H. A. Mullett, D. W. Pontius, G. T. Seely, Claus Spreckels, R. A. West, H. B. Potter, vice-chairman; C. W. Kellogg, vice-chairman, and H. B. Flowers, chairman.

Uniform Motor Vehicle Regulatory Laws

During the winter just past there have been in session forty-five State Legislatures, and legislation affecting the operation of motor vehicles for the transportation of passengers and freight on the public highways has been passed in twenty-two states, which is of varying degrees of importance. Some of the states, such as Iowa and Oklahoma, have passed general, full and complete regulatory laws affecting motor vehicle common carriers. Other states have merely amended certain sections of their present laws. In seventeen states a gasoline tax has been imposed upon all motor vehicles whether common carriers or not, making a total of thirty-six states now having such a tax. Ten states have increased their gasoline tax, the amount of the increase varying from 1 cent to 2 cents per gallon. The gasoline tax runs from 1 cent to 3 cents per gallon, the lower figure being the rate of taxation in the states of Arizona, Connecticut, Kentucky, Louisiana, Maine, Mississippi, New Mexico, North Dakota, Texas and Vermont and the higher figure the rate in Florida, Georgia, Oregon, South Carolina and Virginia. In seven states there was no attempt made to pass legislation affecting motor carriers. In six states legislation was attempted but failed. In the state of Wisconsin a bill has been drawn and reported favorably by the committee, which remains for the action of the Legislature.

There remain almost as many plans of taxation of motor vehicles and motor vehicle common carriers as there are state-taxing bodies. The complete plan of taxation per ton-mile of travel over and along public highways, as suggested by this committee in its report at the last annual meeting, was adopted in one state (Iowa), with the exception that the rate of taxation suggested was changed from 1 cent and 1½ cents to ⅛ cent and ¼ cent respectively. In one state (West Virginia) the taxation of motor vehicle common carriers is based on a prescribed sum per passenger seat-mile for passenger-carrying vehicles, such prescribed rate being higher for heavier motor vehicle units and lower for lighter units.

PLANS OF TAXATION CHAOTIC

In general, however, the plans of taxation remain chaotic, unscientific and unremunerative. As a rule the taxes in all states are much lower probably than the cost of maintaining highways damaged by motor vehicle common carriers. Until this situation has been corrected the public will be subsidizing the operation of these new transportation units.

In all legislation of a general character passed during the last winter, the requirement of a certificate of convenience and necessity before a motor vehicle common carrier can operate has been enacted into the laws. It is manifestly conceded by all parties concerned that such requirement is fundamentally sound. Also, in all states passing general motor vehicle legislation within the past year, liability insurance bonds to protect the public against injuries and damages have been required. This insurance feature, therefore, in addition to the certificate of convenience and necessity feature has apparently been accepted as basicly necessary in any effective motor vehicle regulatory law. There has been some divergence of ideas in the application of these two fundamentals, the insurance required in some states being somewhat less than in others and the character of the insurance being somewhat different. Certificates of convenience and necessity, while required in all new general laws, are issued under very stringent conditions and regulations in some states, and under less close requirements in other states.

There are a few fundamental ideas that must be secured in any new laws in order that regulation may be effective. First, certificates of convenience and necessity, making it unlawful for any motor vehicle common carrier to operate or commence operation until some state authority has consented to the operation of a common carrier by motor vehicle. Second, sufficient power lodged in some department of the state to supervise and regulate the rates, service, accounts, and safety of operations of every motor vehicle common carrier. Third, adequate insurance to protect passengers and public from injuries and damages caused by the operation of motor carriers. Fourth, a compensatory tax which will produce such an amount as will repair the damage done to highways by motor vehicle common carriers. Until a better plan has been devised, it is the opinion of this committee that there should be urged upon the public the necessity of taxing motor vehicle common carriers on the basis of the amount of use of the highways. To secure complete compensation for the use of highways by motor vehicle common carriers, every state should be urged to study this question on the basis of reducing the information to the point of how much damage a ton mile of travel does in cents and fractions thereof to each type of highway commonly in use. When that has been determined by investigation, the rate of taxation per ton-mile of travel can be accurately fixed. Until it has been determined the principle involved in the application of the ton-mile tax should be urged and the rate set at a tentative figure that will be certain to be sufficient. This may be done without particular detriment, because such rate may be changed from time to time as the studies advance without it affecting the sound principle of the ton mile tax. It is vital to all concerned that the present public subsidy in the shape of uncompensated use of roads be withdrawn from motor vehicle common carriers. Every taxpayer is interested in this and every other form of transportation is also interested in it. When such public subsidy has been withdrawn the rates charged on this new form of transportation must necessarily be fixed at such a point as will compensate their use of highways, and when this is done the present unfair and indiscriminate competition will be substantially curtailed.

It is gratifying to note that the draft of uniform motor vehicle law as proposed by the committee at the last annual meeting has been more or less used in many states in framing new motor vehicle common carrier legislation. Many parts of such laws have been written quite largely from the tentative draft adopted by this association at its last annual meeting.

The report was signed by A. W. Brady, Ralph R. Bradley, David Daly, D. W. Pontius, B. E. Tilton, H. E. Chubbuck and C. D. Cass, chairman.

Construction and Maintenance of Highways for Motor Vehicles

The committee on cost of construction and maintenance of highways for motor vehicles was appointed in the year 1922, and sent to the electric railway company in each state located in or near the capital a questionnaire requesting certain data. The replies were not received in time for the committee to report at the 1922 convention; therefore, the committee was continued for the year 1923.

Replies to the questionnaire indicated that many states have not kept authentic records of the cost of construction or maintenance of their improved state highways and there was practically no record of costs in connection with county highways. The committee's information also indicated that many state highway departments which have not kept detailed cost records are starting to keep construction and maintenance costs which should be available in the future. Data on county highways probably will not be available for some years to come.

An examination of the tabulated data received by the committee shows that, with few exceptions, the costs of highway construction and maintenance have increased steadily from 1917 to 1921, due to the construction of concrete, stone-block or brick pavement types of road instead of macadam and to the recognized increase in cost of labor and materials of all kinds. Obviously, costs of highway construction and maintenance will vary widely in different states due to the differing climatic conditions and soils, types and widths of highways, varying costs of labor and materials and density and character of traffic.

In order to determine the annual cost to any state of its improved highways it is, of course, necessary to know the total amount of money invested in highways from which the interest, depreciation and other fixed charges thereon can be obtained. These charges, to which should be added the annual maintenance costs, will represent the total annual highway expense. The determination of the depreciation charges requires knowledge of the estimated life of each type of highway for the character and density of the vehicular traffic accommodated by it. Information of this character is not now available, although elaborate tests are being made by the U. S. Bureau of Public Roads, various state highway departments and educational institutions.

The committee presents in tabulated form the data received showing partial figures of the construction and maintenance costs per mile for twenty-seven states, together with the mileage for the years 1917-1921 inclusive. The report says that it is realized that this information is not complete and in some instances may be inaccurate, but it gives a fair idea of average construction and maintenance costs for the years indicated. Figures as to motor vehicle registration and revenues collected by the U. S. Bureau of Public Roads are also included.

The conclusions of the committee are: That there now is a noticeable absence of accurate data on highway costs; that there is need of definite action on the part of the several states to obtain accurate cost data on the various types of road in use, in order that an equitable plan of taxation may be devised to meet the expense incurred through the increasing use of highways by motor vehicles.

The report was signed by J. S. Bleecker, C. M. Cheney, W. F. Graves, Samuel W. Greenland, E. C. Johnson, E. P. Roundey, J. N. Shannahan, H. M. Steward, and W. J. Harvie, chairman.

CO-ORDINATION OF ELECTRIC RAILWAY AND BUS TRANSPORTATION

President Emmons then announced that the rest of the session was to be devoted to a consideration of the subject of co-ordination of electric railway and bus transportation. Papers were read by Alfred Reeves, general manager Automobile Chamber of Commerce; L. S. Storrs, president Connecticut Company, New Haven, Conn., and D. W. Pontius, vice-president Pacific Electric Railway, Los Angeles, Cal. These addresses will be found elsewhere in this issue. The meeting then adjourned, after Secretary Welsh had announced that the association had received from the United States Department of Commerce copies of its recent "Survey of Business." Copies of this survey were available to the delegates at the convention.

Wednesday's Session, A.E.R.A.

PRESIDENT EMMONS called the second session of the American Association to order promptly at ten o'clock Wednesday morning. The first order of business was the report of committee on nominations, which was presented by J. H. Pardee, chairman. The association acted on the report, electing the following officers for the ensuing year.

President, Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad and Chicago Elevated Railroads.

First vice-president, J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

Second vice-president, F. R. Coates, president Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

Third vice-president, W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.

Fourth vice-president, R. P. Stevens, president Republic Railway & Light Company, New York.

Treasurer, Barron Collier, president Barron G. Collier, Inc., New York.

The new members of the executive committee are: J. H. Hanna, vice-president Capitol Traction Company, Washington, D. C., and H. B. Flowers, president New Orleans Public Service, Inc., representing railways, and E. F. Wickwire, secretary Ohio Brass Company, Mansfield, Ohio, and Cornell S. Hawley, Consolidated Car Heating Company, Albany, New York, representing manufacturers.

J. P. Barnes, as chairman, presented the report of the committee on valuation. In view of the great importance of this report, it will be published in full in the JOURNAL next week.

The valuation report was discussed by H. M. Brinckerhoff, Prof. A. S. Richey and J. A. Emery. Mr. Brinckerhoff called attention especially to the reference of the committee report to the yardstick method of making valuations. He stated that the form of valuation report and the method of proof are of great importance. We have reached the point where valuation engineers have had sufficient experience so that they ought to have somewhat standardized methods. However, he stated, there is very great diversity of methods, both with engineers and with commissions. It should be possible to state the physical facts so that these would not have to be brought out in testimony in hearings.

With the knowledge we now have of costs, it ought to be possible quickly to prepare a rough estimate of value with sufficient degree of exactness to make it acceptable in formal proceedings. As bearing on this contention, he cited the fact that a building contractor will figure the exact cost of a few of the major items and estimate the rest on the basis of cubical content, and he succeeds in doing business on this basis. There is no need to go into such great detail with utility valuation work. He stated we ought to be able to get engineers to agree on many factors and thus make it possible to get an estimate easily, which would be near enough for practical purposes. This ought to be driven home to both engineers and lawyers.

Mr. Emery called attention to the fact that the committee's report was unanimously agreed to by all of the members and commented that at the beginning of their work this was hardly thought to be possible. The principal controversy nowadays is between the reproduction and the prudent investment methods of valuation. Since the opinion of Justice Brandeis in the Southwestern Bell Telephone decision of the United States Supreme Court, a good deal has been made of the investment method. Mr. Emery pointed out that this would mean that if a company had invested $3,000,000 before the war in a piece of property and $7,000,000 since then, it would have a total valuation of $10,000,000. But he pointed out that this could obviously not be taken as a measure of the valuation, for the amounts of labor and material involved in the $3,000,000 piece of work might be greater than that in the $10,000,000 piece. His point was that the $3,000,000 and the $7,000,000 items are altogether different and cannot be added. If an effort is made to translate the present and pre-war values of the dollar to equivalent basis, then one is back practically to the problem of determining reproduction costs.

On the matter of depreciation charge, Mr. Emery stated that there has been a tendency in late years to assume that this was for the purpose of wiping out investment. He stated that this was entirely at variance with recent opinion of the United States Supreme Court. If a piece of property wears out the company is entitled to get that back in terms of present-day value. He acknowledged that there were serious accounting difficulties in this.

On motion, the convention adopted the report of the valuation committee.

W. R. Maltbie presented the report of the committee on special taxes by making a very able review of it. The report follows in abstract:

Special Taxes

In view of the fact that so many burdens carried by public utilities, and particularly by the electric railways, have been disguised under other names, it is necessary for any intelligent discussion of the subject that we have a definition of "tax." For the purposes of the present report we are regarding as a tax any charge imposed or service exacted which operates to the benefit of the community as a whole or to any part thereof, excepting such charges or services as react to the benefit of the users of the street railways in the ratio of their respective use.

With this definition of taxation in mind the committee prepared a questionnaire, and forwarded it to all of the member companies with the hope of determining definitely the full variety of tax burdens, and to some extent the total tax burden, carried by the industry. Replies were received from 113 companies and the following tabulation made.

Excess Profits Taxes—Excess profits taxes are, of course, no longer imposed, but the fact that in a number of cases the excess profits taxes imposed for the year 1917 and subsequent years have not yet been adjusted, and the further fact that the government still has a considerable period of time within which to review the returns for the later years of the operation of the excess profits tax law, fully justify, your committee believes, a discussion of the question at this time.

The street railway industry passed, in many if not most of our larger cities, through a period of consolidation. At that period security issues were not under the control of public service commissions, and accounting standards for the industry had not yet been unified and were to some extent undeveloped.

The minor companies owned in many cases valuable intangible rights and these, together with the anticipated increased revenue resulting from the economy and efficiency of consolidated operation, were capitalized by the promoters of the consolidation, in accordance with the then current business practice.

But an internal revenue department field agent, examining in 1920 or 1922 an income tax return for the year 1917, 1918, or 1919, can find nothing in his rules and instructions to cover such a situation and therefore is apt to slash millions of dollars out of the invested capital claimed by the company, change its surplus into a deficit, and finally present it with a bill for taxes on excess income.

Some of the cases have been adjusted and the companies relieved by the presentation of evidence establishing the value of intangibles and thus restoring to invested capital all or a part of the amount wiped out by the field agents of the internal revenue department. In other cases the companies have decreased or set aside the levy for excess profits tax by showing that they were entitled to increase for the years in question the modest provisions made for depreciation, although the result (since under commission regulation comparatively few companies carry any appreciable surplus over from year to year) must necessarily be to seriously reduce the surplus or even to create, at least for income tax purposes, a deficit.

It has been suggested by some of the companies that it might be possible to handle this situation on the basis set down by Sec. 210 of the act of Oct. 3, 1917, whereby the deduction to be made can be determined by a comparison with standard concerns in the same line of business. Some work was done by our predecessor committee with the idea of assisting in such a movement, but the difficulty of finding representative companies whose returns had been already examined and pronounced satisfactory by the government, coupled with the difficulty of applying such a standard on account of the unstandardized character of operating conditions, led the committee to abandon this mode

SUMMARY OF TAXES PAID BY
104 ELECTRIC RAILWAYS

DIRECT TAXES

Federal corporate stock tax (seventy-five companies reported)		$274,820
Federal income tax and state income tax:		
Federal income tax (sixty-seven companies)	$3,486,016	
State income tax (eighteen companies)	596,631	
Federal and state income tax (one company)	6,648	
Total (seventy-three companies reported)		4,089,295
Real and personal property taxes:		
Real property tax (sixty-five companies)	$2,734,928	
Personal property tax (thirty companies)	3,720,443	
Real and personal property taxes (thirty-three companies)	5,669,446	
Total (ninety-nine companies reported)		12,124,817
Franchise tax (fifty-one companies)		1,822,434
Real and personal property and franchise taxes (three companies)		330,752
Gross receipts tax (fifty-one companies)	$3,101,276	
Franchise tax and gross receipts (three companies)	87,318	
Total (fifty-four companies reported)		3,188,594
Net receipts tax (two companies)		1,796,568
Licenses:		
Car licenses (twenty-six companies)	$431,032	
Pole licenses (nine companies)	3,365	
Wire licenses (two companies)	2,260	
Track licenses (seven companies)	7,213	
Car and pole licenses (one company)	717	
Car, pole and wire licenses (two companies)	11,143	
Pole and wire licenses (one company)	1,033	
Car advertising licenses (one company)	125	
Total (thirty-five companies reported)		456,888
Miscellaneous taxes (forty-six companies)		826,128
Total direct taxes		$24,910,296

IMPOSTS

Paving construction and paving repair and maintenance:		
Paving construction (sixty companies)	$2,372,143	
Paving repair and maintenance (sixty-four companies)	2,466,045	
Paving construction and paving repair and maintenance (three companies)	580,355	
Total (eighty-four companies reported)		$5,418,543
Street cleaning and street sprinkling:		
Street cleaning (ten companies)	$660,944	
Street sprinkling (twenty-three companies)	70,422	
Street cleaning and street sprinkling (two companies)	40,644	
Total (thirty-four companies reported)		772,010
Snow removal (thirty-one companies)		325,870
Bridge construction (ten companies)		262,009
Bridge repair and maintenance (thirty-four companies)		216,692
Traffic policemen (six companies)		115,937
Support of public service commission or other body or officer (twenty-five companies)		172,291
Street lighting (thirteen companies)		47,286
Free transportation of police, firemen, mail carriers and municipal employees:		
Police (seventeen companies)	$523,866	
Firemen (thirteen companies)	242,313	
Police and firemen (thirteen companies)	472,119	
Mail carriers (two companies)	473,306	
Municipal employees (five companies)	62,272	
Total (thirty-one companies reported)		$1,773,876

In addition to the above, forty-seven companies reported that they give free transportation to police, firemen, mail carriers or municipal employees but no record of the amount is available.

Miscellaneous imposts (six companies)	$289,744
Total imposts	9,394,258
Total taxes	34,304,554
Total operating revenues	358,530,280

Direct taxes as percentage of operating revenue, 6.9 per cent.

Total taxes as percentage of operating revenue, 9.6 per cent.

of attack; and, so far as we know, it has not been satisfactorily followed by any company in the industry.

DEPRECIATION

The difficulties which the companies are finding today since the repeal of the excess profits tax, arise chiefly out of a ruling of the department on the question of depreciation.

The government has always been willing in the administration of the income tax to allow as a deduction from income a reasonable sum based upon the estimated life of the unit of property in question. In the case of a corporation the department is disposed to insist that this depreciation cannot be allowed unless it is charged off against capital or set up upon the books as a reserve.

The rulings of the income tax division and the income tax law itself have been changed in this regard a number of times.

The present situation may be summarized as follows:

1. The present law and the act of 1918 make no requirement that the depreciation claimed shall be charged off.
2. The treasury regulations require that all depreciation claimed should be charged off, but that where it has not been charged off the books may be reopened and the proper allowance claimed.
3. Where on account of the payment of dividends in previous years there is no available surplus against which the proper credit to a depreciation reserve can be debited the allowance can still be claimed by writing it off against principal or capital. In such case the ordinary dividends in the years when proper depreciation was not claimed would seem to become a liquidation dividend in whole or in part and therefore under the revised ruling (Regulations 62, 1922 edition, Paragraph 1546) not to be subject to tax in the hands of the stockholders.
4. Banks, as a special class of corporations subject to federal or state control in their accounting, may carry supplemental books of account showing depreciation charged off without entering this charge upon the books required by state and federal authorities.

Conflict Between State and Federal Depreciation Regulation—In this matter of depreciation the electric railway industry, in common with other public utilities, finds itself in a situation somewhat similar to that of the banks. For income tax purposes the federal government allows a certain deduction of depreciation as an operating expense, the particular rates being subject to the approval of the treasury department. These rates are fixed or are supposed to be fixed on a straight line basis adjusted so as to accumulate by the end of the useful life of the various classes of apparatus the total difference between original cost and scrap value. A private corporation consequently, without fear of criticism, public or private, may adjust its rates so as to earn the full amount of this depreciation plus a reasonable return, distribute the reasonable return to its stockholders, and hold the full amount of the depreciation, without payment of any income tax thereon, as a reserve to be invested in expansion of the plant or elsewhere to benefit the stockholders.

The public utility, on the other hand, usually finds its appropriations to a depreciation reserve limited by action of the public service commission under which it operates and further finds its earnings limited to a fair return over and above the commission-fixed allowance for depreciation. If by chance the depreciation allowed by the commission is equal to that allowed by the income tax department of the federal government, the dual control introduces no difficulty, but if, as sometimes happens, the depreciation allowance set up by the commission is less than that allowed by the federal government, the utility must either accept the depreciation allowance as limited by the commission and therefore pay to the federal government an income tax upon earnings which would be tax free with a private corporation, or else make up the difference between the commission depreciation and the income tax department depreciation out of its net earnings applicable to fair return, and in the latter event either decrease the return to its stockholders below the fair return allowed by the commission or else treat a part of this fair return as a liquidating dividend resulting in depletion of capital and impairment of credit. It would seem desirable, therefore, that the industry should attempt to secure a special ruling similar to the bank ruling above noted.

INCOME TAX BUREAU'S ATTITUDE

The situation outlined above, common to all public utilities, is further complicated in the case of the electric railways by the attitude of the income tax department toward depreciation of way and structures. If a company has been in existence for a number of years and has a large quantity of diversified trackage, it is probable that the lapse of time has brought about such an equalization of replacement charges that the tracks and right-of-way structures are maintained in status quo by a practically uniform annual expenditure on maintenance and replacements. It is therefore unimportant from the accounting and financial point of view whether (1) a part of this necessary annual sum is appropriated first to a depreciation reserve and then charged out of the depreciation reserve for major replacements, or (2) the entire sum is charged directly to maintenance without the intervention of a depreciation reserve account.

The Interstate Commerce Commission therefore in making up a standard system of accounts for electric railways (which system has been adopted by many if not most of the state commissions) has left it optional with the companies whether they will carry a depreciation reserve for way and structures or will maintain them in full operating efficiency by direct charges to maintenance for such replacements as may be necessary.

In the steam road case arising under the act of 1909 the court ruled that the depreciation of the roadbed and of the structures connected therewith must be treated as a whole. The jury under these instructions found no depreciation, and the decision thus reached by the lower court was upheld by the Court of Appeals. The expense of keeping the road in repair and of making replacements had, of course, been claimed and allowed as maintenance.

Basing its action apparently upon this decision, the income tax department is refusing to allow to electric railways any depreciation on way and structures, thus practically forcing the industry to adopt the second of the alternatives allowed it by the Interstate Commerce Commission.

In all cases where the diversity of the items which enter into the account, the magnitude of the plant, and its age have in combination produced an equalization of renewal charges from year to year this ruling works no hardship, but in all other cases it is apt to result in a distinct financial injury to the utility.

It is the feeling of the committee, therefore, that the association should attempt to secure a revision of the ruling of the income tax division so as to leave to individual electric railway companies the option allowed them by the Interstate Commerce Commission.

STATE AND LOCAL TAXATION

Besides federal taxation as discussed above the street railway industry makes contributions to the state, to the county, in the case of interurban or suburban lines, and to the local municipality or other taxing district. The burdens imposed under this head may be divided into three broad classes:

1. The usual tax on real estate and personal property, paid in common with all other citizens of the state, whether individuals or corporations. In this class would also be included state income taxes. This first class represents the same type of burden as that imposed upon general corporations or individuals.
2. Special types of taxes not applied to the general corporation but either to utilities as a class or to the street railway as a special type of utility. In this class may be included taxes upon so-called intangibles, and upon franchises or easements.
3. A long list of special burdens imposed upon the transportation industry and not imposed either upon private citizens, general corporations or other utilities. These special burdens for the most part consist in the requirement that the utility shall render free service either to certain groups of citizens or employees or shall perform individually at its own expense certain pieces of public work. They are taxes in that they are expenditures which would otherwise be paid for out of the public purse and are therefore,

to the extent of their cost, just as distinctly a tax burden as a definite rate imposed upon real estate.

No special consideration need be directed to taxes of the first class.

It is hard to lay down any general theory of taxation based upon equitable considerations which will justify taxes of the second class. There is certainly no basis for imposing upon the public utility a greater tax burden than is borne by the average normal corporation. The second class of taxes, therefore, must be justified, if at all, upon either practical considerations or as a historical survival from times when they had a practical economic basis.

But it should be noted that in cases where some such historical or practical justification may be adduced it is the justification of a gross receipts tax as a substitute for the flat property tax to which an ordinary corporation is subjected, and in no sense a justification of a gross receipts tax super-added to a flat property tax, except possibly in those cases where the gross receipts tax is contractual in its character and partakes of the nature of a payment for the franchise.

The justification of franchise or easement taxes demands also the assumption of conditions which existed at one time in the history of the industry but exist no longer. Given a street railway, for example, which enjoyed a legal monopoly of mass transportation at a fixed rate under which it was able to make large profits upon its invested capital, it was not illogical for the public to reason that these large profits were possible only because of certain exclusive rights in the public street, that these exclusive rights, protected by law, became valuable property which was in itself profit-producing to the owners of the utility, and that therefore it was not inequitable that they should pay a tax thereon.

But, given a complete change of the theory of operation by which the profit-producing character of the exclusive right is destroyed and the profit limited to only a fair return upon the property owned exclusive of the franchise rights, the justification for the franchise tax is destroyed and instead of being a levy upon the stockholders in proportion to the value of property owned by them it becomes merely an indirect burden placed upon the users of the utility for the advantage of the general public.

BURDENS IMPOSED BY PUBLIC

Taxation of the third class, consisting of various service burdens laid upon the utilities for the benefit of the general public, sub-divides at once into two sub-classes according as the tax in question was or was not justified.

The nature of this classification will be perhaps clearer if we will consider first the distinction between a true operating or construction charge and a public burden. If, for example, it is desired to extend a street railway system over a street already improved with a high-grade, modern pavement, the cost of cutting through this pavement and restoring the street to its original condition is a construction cost properly chargeable against the users of the street car service. Moreover, if from time to time it becomes necessary to open the pavement at certain points, the cost of such opening, together with the cost of restoring the pavement to its original condition, is a true operating charge made solely as an incident of operation and properly chargeable to the users of the utility.

If, however, on the other hand, the street car line precedes the pavement, operating over an ordinary road which the municipality decides to improve with a modern pavement; or if the pavement finally wears out under ordinary traffic conditions and it becomes necessary to repave, such repavement or such new pavement cannot properly be charged as either a construction or an operation expense. If the presence of the track increases the construction or maintenance cost of the pavement, the excess may properly be charged to the railway. If more than this is charged, it becomes merely a burden upon the users of the utility service for the benefit of the general community.

Returning to our two sub-classes of the third type of public burden we would note that the first and most important item in the first sub-class, namely, the class of those which were historically justified at the time of their first imposition, is the matter of paving construction and repair. In the horse car days the transportation companies found paving essential and were, in turn, one of the heaviest users or consumers of paving surface. It was therefore, to this extent at least, logical to require the companies to construct and to maintain the paving within the track space.

But even in these early days the other side of the situation seems to have been entirely overlooked. While it was true that the street railway traffic did wear out pavement and should therefore be charged with renewal costs as an operating expense, it is also true that other vehicular traffic, attracted to the rail as an iron tramway, assisted in the wearing out of the railway rail, acted as an interference with railway traffic, and contributed perhaps even more than the railways themselves to the wear of the pavement within the track space. It would seem therefore logical that the street railways should have claimed out of the general tax levy a credit for public service rendered as an offset against the admittedly logical charge for pavement outworn.

Today there is no longer any logical basis for any pavement cost whatever, except that purely incidental to and resulting from the operation of the cars over the tracks. The street car rider is paying a portion of the expense of providing a smooth pathway for the pleasure rider, the commercial truck, and even the jitney competitor.

The second sub-class consists of those public burdens which were never logically justified by any relation to operating cost. There is no logical reason, for instance, why the users of the street car system should pay for the transportation of the public police.

All of the public burdens of this second sub-class originally found their justification, so far as they could be justified, in purely practical considerations. The railways were operating under fixed rates of fare determined by charter or by act of the legislature. They were believed by the public to be extremely profitable businesses, and any additional burdens which could be loaded upon them, either with or without their consent, represented a transfer from the pockets of the stockholders to the public coffers and by so much decreased the general tax rate and the burden upon the general public. In other words, these burdens were a tribute paid by the operators of the transportation system as the price of non-interference by the public with a situation or business which it was believed would, even then, remain profitable.

REGULATION HAS CHANGED SITUATION

With the development of commission regulation, however, the entire situation changed. The business no longer operated upon a fixed charter or legislative rate but under a rate subject to constant modification by a commission operating on the theory of allowing only a fair return on fair value and allowing this fair return in addition to all operating costs, including both direct and indirect taxes.

In consequence of this changed theory of operation there was an immediate transfer of the public burden from the shoulders of the stockholders of the property to the shoulders of the users of the utility service. The more perfect and automatic commission regulation becomes, and the more frequent the rate adjustments, the more complete the transfer of the burden, until today in many states the street railway, instead of being a genuine taxpayer, has become merely an instrument by which a considerable percentage of the burden of public administration and public protection is, under the disguise of a charge for service, collected for the benefit of the people as a whole from the users of utility service, and even from them not in proportion to their need for public administration and public protection but in proportion to their use of the facilities furnished.

The inequity of this condition which, be it noted, does not operate to the injury of the street railway stockholder, has been still further heightened by the development of transportation other than the electric railway.

It is the opinion of your committee, therefore, that all taxation or public burden in addition to the taxes imposed upon other corporations, imposed upon a transportation system under public utility regulation, is inequitable to the users of the service; and that it is also injurious to the street railway system in that it introduces an unnecessary cost into the operation of the road and by so much increases the difficulty of developing proper public relations. We recommend, therefore, that our member companies give full publicity to the existing situation with regard to public burdens and co-operate with the users of their service in an attempt to have the public burden properly distributed over the general public.

Public utilities as a class should be able to make out a strong case for preferential treatment at the hands of the taxing authorities. Commission regulation sets a maximum rate of return slightly above the legal rate of interest. Practical economic considerations at the present time are holding the net return of many of the street railway companies at an even lower figure. The riding public, therefore, who are the real users of the street car investment, would seem entitled to claim the same low tax rate as, for example, the security holders or the bankers.

On the other hand, public utilities as a class and the street railways in particular play an absolutely essential part in the development of community wealth. They would seem, therefore, entitled to claim as favorable treatment as a manufacturer or merchant, particularly in view of the fact that the merchant or manufacturer, taxed upon his invested capital and turning over his invested capital from three to five times per year, is compelled to increase his sales price by only one-fifth to one-third of the tax percentage, while the utility, requiring by the nature of its business from three to five years to make a single turnover of its invested capital, must increase its sales price to its ultimate consumer by from three to five times the tax percentage.

Sooner or later the public itself will object to public utility taxation in excess of that imposed upon other corporations of no greater importance to community growth. If public utility regulation by commissions becomes thoroughly effective; if the owners of the property represented by the stock and bondholders, are limited to a fair return as compensation for the accumulated wealth devoted to the public service; and if the tax imposed has no effect whatever upon reducing or increasing the income which these owners receive; the next step in logical development is for the users of the service to refuse to bear an excess share of the public burden because the nature of their business or their habits of life compel them to make use of the utility.

There is another reason for the discussion of this problem, apart from the interests of the street car companies and the interests of its patrons. One of the most serious problems of the day is that of municipal, state, and federal extravagance. The check upon public extravagance is to be found only in a demand on the part of the public for economy, and one of the first and most important steps in the development of this public demand is the elimination of indirect taxation. The tabulation shown in this report indicates that approximately 10 per cent of the gross receipts of the street car companies of the United States is devoted to some form of public burden. The average fare at the present time is 6.92 cents or, in other words, an average of nearly two-thirds of a cent out of every street car fare collected in the United States is an indirect tax upon the street car users for the benefit of the general public.

The average workman riding to and from his work three hundred days in the year pays in this one item an indirect tax of approximately $4. If this indirect tax and other numerous indirect taxes which he pays could be bundled together with the relatively small direct tax which he is called upon to meet, labeled, and known to him as a tax, we would find a pressure for public economy making itself evident at the polls in unmistakable fashion.

While no such radical action on public utility taxation is to be immediately anticipated, your committee is convinced that the present nation-wide study of the whole tax problem must lead to important changes, and that our member companies should adopt a uniform attitude and aid in the early development and adoption of an equitable and intelligent scheme of public utility taxation.

The report was signed by Edwin Gruhl, A. G. Neal, A. M. Robertson, H. B. Sawyer, Paul Shoup, and W. H. Maltbie, chairman.

President Emmons gave credit to Mr. Maltbie for having secured the return of several hundred thousand dollars paid in taxes by the Baltimore company, and stated that railway companies in trouble should know that there is a way to get relief.

F. W. Doolittle presented a very able paper on "Essential Operating Costs." This appears elsewhere in this issue.

MR. DALRYMPLE GIVES TALK

James Dalrymple, manager Glasgow Corporation Tramways, who attended the convention all the week, gave a brief talk before the American Association Wednesday morning. He was reminded, he said, that when he first visited the United States some twenty years ago, he was looked upon with suspicion because of the municipal operation of the Glasgow Tramways. He added that the question of municipalization was then very much to the front in this country.

It is now thirty years since Glasgow began the operation of its railways. The occasion for that was the expiration of the company's franchise. The city tried over a long period of time, he said, to come to some reasonable arrangement with the company, but the company then operating was so shortsighted and so arrogant that the citizens finally gave up hope of reaching any reasonable settlement and had to take the property over and operate it. If the street railway in Glasgow had been operated then as the railways of this country are now being operated, he said, he doubted if it would have been taken over by the city, at least at that time.

The operation in Glasgow was successful almost from the start, and it was this that gave great impetus to the spread of municipal ownership in Great Britain, where about 100 railways are now municipally operated.

Mr. Dalrymple said that municipally operated companies there had had their ups and downs and had had to fight for their existence. He said that we are discussing the same subjects here as they are in Glasgow, both as to revenue and operating expenses. The railways there had to increase their fares in practically every instance. The statutes formerly limited most of the railways to a 2-cent a mile maximum rate. Many of them which were operating for less money have had to raise to the maximum and many others which were operating at the maximum had to go as much as 100 per cent over the 2-cent rate. Very few fares have been reduced. There has been a large increase in the cost of wages and materials. Materials are two to three times above the pre-war cost there, and wages are about 100 per cent higher.

Mr. Dalrymple commented that since he was here last, ten years ago, he has noted a remarkable improvement in all of the companies visited on his present trip. He said that the railways were in very much better condition than ten years ago. He observed that the railways here are considering their obligations to the citizens in the United States more than ever before.

As to the principle of municipal ownership, he said that they had a feeling in Great Britain that if the citizens of a city say they want to run the street railways themselves, they ought to be allowed to do so. If any city decides that this is the right principle to follow, then it must pay to the company, of course, full value for what is taken over.

Charles E. Elmquist, formerly chairman of the Federal Electric Railways Commission, presented a paper in which he reviewed some aspects of the commission's work in the light of the experience of the last four years and made some suggestions for the benefit of the railway industry. Mr. Elmquist's paper appears elsewhere in this issue. His paper was prefaced by some most interesting discussion of the political situation in Minnesota, as a result of which he left his audience with the feeling that in spite of recent elections, the integrity of the people of Minnesota is not in danger and that conditions there are fundamentally sound.

A COMMISSIONER'S FORUM

Following the address by Mr. Elmquist, the convention had the pleasure of listening to addresses by five public utility commissioners: Dwight N. Lewis, member Iowa Board of Railroad Commissioners and president of the National Association of Railway and Utilities Commissioners; Henry C. Attwill, chairman Massachusetts Department of Public Utilities; Charles C. Marshall, member the Public Utilities Commission of

Ohio; Lewis E. Gettle, chairman Wisconsin Railroad Commission, and William Milnes Maloy, chairman Public Service Commission of Maryland. These men discussed both the specific situations in regulation in their several states as well as general regulation problems. Abstracts of their remarks are presented in a symposium elsewhere in this issue.

Thursday's Sessions, A.E.R.A.

THE final session of the American Association was called to order by President Emmons on Thursday morning. C. L. Henry, Indianapolis, presented a proposed revision to the constitution and by-laws, providing as follows:

Proposed Addition to Article VI (d) to follow at the close of this Article.

If a meeting is held without a quorum present, the action taken at such meeting will be deemed legal and binding, the same as if a quorum were present, if the minutes of such a meeting are approved at the next subsequent meeting at which a quorum is present.

On motion the meeting adopted the amendment.

F. R. Coates presented the report of the committee on publicity, an abstract of which follows.

Committee on Publicity

A report of your committee on publicity of necessity must overlap somewhat on the work of the special manufacturers' committee on co-operation, the committee of one hundred and the accident prevention committee. This is because the work of all of these committees and that of the advertising section, through which all our publicity and advertising work clears, are very closely co-ordinated.

Epitomized, the work of the advertising section touches the advertising and publicity fields of electric railway and manufacturer companies, all daily and weekly newspapers in the United States, and the state committees on public utility information. All told, the section is co-operating with about 1,000 publicity and advertising men throughout the country who aid in the gathering and dissemination of good-will material.

One of the most important functions of the advertising section is to make available to newspapers, magazines and other publications facts about the electric railway industry. The committee's efforts have been to render a genuine news service to the newspapers and magazines, and proof that it has accomplished this endeavor is found in the fact that all statements and stories that it has released have been used generously by the large press associations serving the daily newspapers, the weekly newspapers and magazines. It never has offered for release a single statement which has been refused publication on the ground that it was colored or biased, or rejected on the charge that it was for propaganda.

News material has been released very largely during the last year through two main channels, the national press associations for the daily newspapers, and the state committees on public utility information for the weekly newspapers. Direct mailing to newspapers, except when news material of only local significance has been offered, is not followed for the dual reason that if a statement has news merit, it will be handed to the larger papers by the national press associations, and the state committees will take care of the smaller papers. Editors are overburdened with news releases and the committee seeks to aid them by avoiding direct mailing.

Special emphasis is laid by the committee on the fact that electric railways have two things of interest to newspapers—news material which has facts of general interest to the public, and advertising material, which may have news interest, but primarily belongs in the paid space sections of the papers. There is no reason in your committee's opinion why any newspaper should publish material belonging in paid space in its news columns, and the committee not only exercises great care to keep such material out of its news releases, but also urges individual companies to follow the same course.

At different times during the year larger newspapers of the country have carried news releases supplied by your committee dealing with: Growth of the electric railway industry in the last thirty years. Financial problems of electric railways. Public relations. Reviews of all major phases of the 1922 electric railway situation by the president of the association. The industry's need for more men. Electric railway financing. Trackless transportation. Need for uniform motor vehicle laws. Maintenance and construction of highways. Interest of the car rider in electric railways. Failure of the 5-cent fare in Seattle and of buses in Saginaw, the weaknesses of municipal operation and various other news stories. Your committee believes that all of the news statements previously mentioned were of a constructive character, calculated to aid in maintaining good local transportation for the benefit of the public generally.

The committee wishes to say that one of the first things that every state committee should do—and most of them do—is to urge paid advertising upon utility managements. Advertising does pay, and utilities should pay for everything that is properly classed as advertising. If you think you can go into a state committee and get free advertising into the newspapers which should go in as display, you had better stay out. It can't be done, and no fair-minded utility man should ask it—unless, of course, he is willing to give free street car service, electric lights, heat, water and telephone to papers just as he asks them to give away their space for something which is not news.

The advertising section has co-operated with the special committee on manufacturers' co-operation to a greater extent during the last year than ever before. Under the general direction of Chairman Wickwire the section has not only supplied material to the manufacturers for use in their good-will work, but also has helped conduct an intensive organization campaign for them. At the beginning of the present fiscal year only a few manufacturers were doing any good-will work for electric railways or had gone on record as being willing to do it but now approximately one hundred companies are enlisted in the cause.

Under a special working agreement between the Association and the committee of one hundred, part of the time of Fred C. J. Dell, director of exhibits, is allotted to this work.

The committee on publicity can think of no effort that would be more helpful to its endeavors as a continuation of the work of the manufacturers' committee as it has been carried on during the past year.

BULLETINS AND POSTERS

Once a month the advertising section, under the direction of your committee, issues a bulletin called *Truth*, which contains current information regarding movements in the electric railway field, consisting of brief news stories, editorial comments, etc.

This bulletin, which is prepared by the director, in a non-technical style, is particularly valuable to state committees on public utility information and electric railway companies and manufacturer companies having house organs.

In fact, much of the electric railway material, not of a strictly local character, which is found in clip sheets of the state committees on public utility information and the forty or more electric railway company publications which are printed in the United States is taken from *Truth*.

Truth not only circulates among these committees and companies, but also is sent to various organizations which use it as a reference or place it on their bulletin boards to be read by employees and others. The total monthly circulation of this bulletin is about 3,000.

At the suggestion of the committee on publicity, the director of the advertising section has been co-operating with the accident prevention committee in the preparation of poster and advertising material designed to decrease accidents.

The services of the advertising section to electric railway companies fall into two general divisions. The first is rendering a regular bulletin poster and suggested advertising material service to companies as a part of the routine and the other is to render special advisory service in local situations.

The committee has been pleased to note during the last year a growing tendency on the part of companies to avail themselves of this special advisory service. Scores of special requests have been made to the director of the advertising section for his advice and suggestion, and many companies, particularly, the holding companies, have sent their publicity men to New York to confer with the director on special problems, such as motor competition, paving taxes and merchandising transportation. Various companies, contemplating the organization of publicity departments, also have conferred with the director for the purpose of ascertaining the requirements of such a department in the way of personnel, finances, and so forth.

By virtue of being in close contact with all the publicity departments of the electric railways of the country, the director is in a position to give suggestions on almost any phase of a publicity or advertising problem. He can and will quickly give information as to what are the best methods of organization and of conducting a public relations department.

The services of the director also are available for companies having big problems of sufficient importance to warrant the director making a trip to the property. Whenever possible his personal services on the ground will be made available for limited periods.

The report includes a list of companies which are using company publications in their publicity work.

RECOMMENDATIONS

The committee believes that its activities should be continued along the general lines heretofore followed and every executive in the industry should lend his hearty support to the section's work, not only by having his advertising men co-operate with the section, but by following its work himself and offering suggestions and advice. The committee believes that the greatest weakness in the public relations machinery of the electric railway industry today is the failure of executives to present their stories personally to the public. There should be more speaking done at state and national gatherings by men whc are familiar with electric railway problems. The committee strongly urges that particular attention be paid to developing this feature of its work during the coming year.

The committee has under way the development of increased service, in the way of posters, suggested newspaper ads and articles for interurban roads, and it strongly urges that this work take precedence over everything else at the beginning of the new year. The committee believes that the taxation problem particularly on city lines is one of the biggest before electric railways, and it suggests that the efforts of the advertising section early in the year be directed toward the preparation of posters and other material designed to place the outstanding tax burden facts before the public. The industry is suffering greatly from pleasure cars giving lifts to prospective customers of electric lines and some advertising material dealing with this situation might well be prepared.

The committee strongly recommends closer co-ordination between the members of the manufacturers' committee and the committee on publicity of the association. If they will strike at the same phases of our problems simultaneously, much lost motion will be done away with and better results obtained.

The report was signed by P. S. Arkwright, J. F. Collins, P. H. Gadsden, L. E. Gould, F. T. Griffith, A. A. Hale, G. A. Richardson, L. S. Storrs, Elton S. Wilde, F. R. Coates, chairman, and Barron Collier, vice-chairman.

John T. Staub, Baltimore, presented the report of the committee on insurance, which follows in abstract.

Insurance

This committee has had several meetings during the course of the year and is compiling data from a questionnaire sent out on the subject of fire insurance. At this writing the data are not available for this report. The committee therefor has deferred any recommendations on this subject until it has obtained from member companies a full and complete report on which to base its conclusions. It has thought best, however, to suggest in this report certain recommendations which will ultimately assist in securing both a better rate and greater fire protection, as follows.

Fire Insurance—1. Inspection System—A system of inspection to be established and maintained, covering all locations and property of the company. This system of inspection to include the following:

(a) Regular monthly reports from the chief employee at each location.

(b) Inspections by a competent man from the head office to check the reports of local chief employees, report any additional information of value in fire prevention or rate reduction and review the fire-fighting organizations.

(c) Inspections and reports by insurance inspectors furnished by the insurance brokers or by insurance bureaus with the object of checking the work under (a) and (b), keeping standards up to the times and giving the insured the benefit of advice as to the latest practices.

2. Fire-Fighting Equipment — With any needful advice from insurance experts each location to be provided with the proper fire-fighting equipment.

3. Fire-Fighting Organization — At each location where practicable, fire-fighting brigade to be formed, instructed and drilled under competent advice.

4. Signaling System — Also, under competent advice, suitable local or central station signaling system, or both, to be installed at proper locations.

5. Analysis of Insurance Cost — For each location, that is, for each risk having its separate insurance rate make-up, a sheet to be made up showing make-up of insurance rate, annual insurance cost and estimated cost of elementary certain charges, and a book of such sheets, covering all the locations of the insured, to be submitted to the management of the determination of the practicability of removing or reducing the various hazards and charges.

6. Adoption and Enforcement of Rule as to Building Changes and Construction—The rule to be adopted and enforced that any plans for changes in buildings or for new building construction are to be submitted to proper experts on rates and risks.

7. Blanket Insurance—As a general rule blanket insurance to be obtained where available.

8. Valuations — That complete detailed valuations be made of property at each location, based upon carefully determined unit values, and upon carefully determined depreciation rates for the various items of property.

The following recommendations have also been made:

If pits are not standard, particular stress should be made on keeping them clean.

If stairs are incombustible, they should be properly cut off.

Tracks should run clear from building without break or transfer table, and should have bumpers so that there would be a clear space of not less than three feet between bumpers and wall of building, and not less than five feet between tracks and side walls.

All rails should be bonded.

Cut-off and trolley switches should be installed covering each section with a circuit breaker.

Proper attention should be given as to leaving trolleys in contact when cars are not in service, while stored in barn.

Metal lockers should be installed.

Hose should always be attached to standpipes and be tested out every thirty days.

The committee believes that the property adopting the recommendations and fully complying with them will secure greater protection and ultimately obtain a better rate.

Fidelity Insurance—Replies have been received from nineteen member companies to a communication sent to a selected list, requesting information over a period of ten years relative to the amount of such insurance carried, premiums paid, losses and number of employees. From a compilation of the information contained it will be noted that over the ten-year period the average ratio of losses to premium is only 18.1 per cent. It will also be noted that of the nineteen companies reporting only seven of them bond platform men. The lowest rate obtained for fidelity insurance by the companies reporting is 15 cents per $100 obtained by the Springfield Street Railway, Massachusetts. All the other companies are paying a rate of 20 cents or higher. While these figures would seem to indicate that even a rate of 20 cents is too high for the risk involved, the costs of carrying the insurance are also exceedingly high. It is felt, however, that the committee should point out that the rate of 20 cents per $100 is standard for this class of insurance and that they should be able to obtain such rate.

The following is a summary of information compiled from answers:

Number of companies replying..	19
Period	1913-1922
Aggregate platform men.........	$18,958,400
Aggregate other employees	$36,396,890
Total	$55,355,290
Total premium	$140,119.65
Total losses	$25,391.69
Average cost per $100.........	$0.253
Ratio losses to premium, per cent	18.1

The sub-committee is inclined to recommend that the practice of bonding platform men be discontinued owing to the difficulty in proving claims, and for the further reason that the experience of the companies seems to be that it would pay them to be self-insurers.

Standardization of Insurance Forms —The attention of the insurance committee has been directed to the liability on the part of a traction line receiving merchandise to be forwarded, which merchandise before it reaches its destination passes over the tracks of other companies; also liability in the case of shipments of merchandise that may be interstate. As the matter stands at present many interurban companies might suffer a severe loss, believing that they are fully protected.

The insurance committee has, therefore, thought it advisable to suggest that the member companies doing business in the Middle West states, as well as those engaged in interstate business, examine their policies and if there is any uncertainty as to the liability thereunder, they amend their forms by adding to the rolling stock item the following words:

". . . all while in the barns or yards or on the tracks of the assured or of others, wherever they may be in the United States and/or Canada."

Should the traction company be carrying common carrier liability insurance, the wording on its form should be made to read as follows:

"$..... on contents of cars for which the assured have assumed liability under bills of lading or shipping receipts or other agreements wherever the car or cars may be in the United States and/or Canada."

The report was signed by Williston Fish, H. A. Nicholl, Edward M. Wilson, Granville H. Bourne, N. H. Daniels, John H. Moran, Paul E. Wilson, Charles B. Scott, C. E. Morgan and John T. Staub, chairman.

C. E. Morgan, Brooklyn, presented the report of the committee on organization of community sections. This follows in abstract.

Organization of Community Sections

The general plan suggested to the committee was to the effect that a community section would consist of individual members of the association living in the same community or within a certain radius, who would affiliate for a mutual study of their local problems and would hold periodic and frequent meetings for this purpose. Special attention to be given to avoid any possible conflict with existing company section membership or other state associations.

The proposed membership would be much broader than any existing company section of the A. E. R. A., providing for not only electric railway employees but also for others interested in the industry, such as engineers connected with commissions, manufacturers supply dealers, students, college professors, consulting engineers, etc.

The committee feels that much good can be accomplished by the formation of such community sections, furnishing, as it does, an opportunity for those interested in the industry to get together at frequent intervals to discuss their common problems. It would give an excellent opportunity to bring together engineers and operating officials as well as the members of regulatory bodies, manufacturers, supply dealers, and in fact all those interested, from whatever angle, in the electric railway transportation field.

After careful study the committee is of the unanimous opinion that such community sections would be extremely beneficial in many ways to the industry and that the association would materially profit by the added membership.

The committee reported its findings with recommendations to the executive committee of the A. E. R. A., along with the proposed changes in the constitution and by-laws. The general plan of establishing such community sections was approved.

The necessary changes to the constitution and by-laws of the American Electric Railway Association are appended to the report.

The report was signed by James P. Barnes, F. R. Coates, C. R. Ellicott, W. H. Sawyer, Martin Schreiber and C. E. Morgan, chairman.

Company Section and Individual Membership

Martin Schreiber, Camden, N. J., reported for the committee on company section and individual members which appears below in abstract. Mr. Schreiber expressed his indorsement of the idea of having community sections and stated that it opened an opportunity to increase the individual membership to 25,000 or more, which was the goal originally in mind when individual memberships were first established.

During the year one large company section has been added to the list of company sections, and none has dropped out.

The new section, No. 14, was organized by employees of the Chicago, North Shore & Milwaukee Railroad. At the time this report was written, the membership was 173.

The company section group comprises the largest group of members in the American Electric Railway Association. As this report is written, the membership of the combined company sections is approximately 1,800. They comprise the cream of the operating forces of the member companies that have established company sections. From these men the companies draw their future supervisory employees. In the opinion of the committee, all companies should assist in the organization of company sections, not only for the good of the men, but also for the good of the company.

The company section meetings afford an opportunity for the exchange of ideas, the development of social contact that makes for good feeling and greater efficiency and provide the men with information about their company that always is immensely valuable when the men are called on to meet criticism or complaints about service.

Year after year the committee on company sections has urged members of this association to organize sections, and believes that executives should take this advice to heart.

Reports from several of the sections, showing the scope of their activities, were appended. Work of two of the sections has been disrupted of late, so reports were not received from them.

The report was signed by C. P. Billings, F. G. Buffe, F. R. Coates, W. J. Flickinger, J. H. Mallon, W. G. Murrin, A. T. Perkins, Harry Reid and Martin Schreiber, chairman.

L. H. Palmer, Baltimore, presented the report of the committee on mail pay, which follows in abstract.

Mail Pay

The committee has carried on the work of preparing the presentation of the case for increased mail revenue before the Interstate Commerce Commission, and the hearing is set for Oct. 15. The reports that were requested of member companies in April, 1922, have been received in part up to August, 1923. On account of this long time the Post Office Department has requested a short delay in order to include these with the tabulation to be referred to before the commission.

The Post Office Department has cooperated in working out the details, and a large portion of the data will be in the form of an agreed joint exhibit, the facts of which are accepted by both sides. This co-operation of the Post Office Department has much simplified the case, and the committee can see no reason why an opinion should not be handed down by the commission at a relatively early date.

The committee regrets the delay in bringing this case to a hearing before the Interstate Commerce Commission. It is due almost entirely to the failure of member companies to furnish promptly the information called for. A number of companies, including several which had authorized the committee to represent them, failed to furnish any information whatever, and after waiting for a long time the Post Office Department finally consented to a hearing with the partial information that was on hand.

The committee states in conclusion that the calculations to date indicate that it can prove that the industry is entitled to a substantial increase in mail pay rates.

The committee report was signed by C. L. S. Tingley, G. K. Jeffries, Samuel Riddle, W. S. Rodger, R. A. Leussler, Gordon Campbell, H. B. Weatherwax, R. P. Stevens and L. H. Palmer, chairman.

W. H. Sawyer, East St. Louis, presented the report of the committee on memberships, company and associate, which follows in abstract.

Company and Associate Membership

Since Oct. 31, 1922, the following gain in membership of the association has been made.

Company	Oct. 31, 1922	Oct. 8, 1923	Gain
Railways	348	339	9*
Associates	15	18	3
Manufacturers	244	289	45
Total	607	646	39

*Loss.

As the total company membership of the association on Oct. 31, 1922, was 607, we show a gain in new companies of approximately 10 per cent.

During the year certain companies resigned their membership or were dropped from the rolls in accordance with the provisions of the constitution, these numbering altogether forty companies, so there has been a net gain during the year of twenty-one companies.

An appendix attached to the report shows a tabular comparison of the membership this year and last year, also a list of the new company members.

PERMANENT CAMPAIGN

It is the recommendation of the committee that the permanent campaign for new members inaugurated last year be continued in the future, and the committee is convinced that much work lies ahead of the new committee in extending the work. The service of the association has become a real necessity to the industry, is essential to its welfare and progress as well as to that of every electric railway company in the country, all of which should be members and support the organization which is the national representative of industry. It is believed that if these facts can be brought home in a definite way to non-member companies they will readily affiliate with the association.

The report was signed by H. H. Adams, W. R. Alberger, A. C. Blinn, Luke C. Bradley, F. D. Burpee, T. C. Cherry, Jilson J. Coleman, L. E. Gould, Edward M. Graham, A. L. Kempster, George R. Lyman, W. J. Lynch, J. C. McQuiston, H. H. Norris, R. T. Sullivan, E. M. Walker, E. P. Walker, E. A. West, E. F. Wickwire, J. H. Wilson and W. H. Sawyer, chairman.

After briefly reviewing this report, Mr. Sawyer addressed the meeting as follows:

Revisions of the printed report to bring it up to date show that we now have 339 railway member companies, eighteen associate companies and 289 manufacturing companies, or a total of 646 companies, which is thirty-nine companies more than we had a year ago.

In this campaign I have personally written practically every non-member railway company in the United States, and my own conclusion from the replies received is that a great number of the non-member companies are simply plain slackers, and if you don't like the word "slackers" I might compromise and call them "spongers." They know that the American Electric Railway Association saved this industry and is making this industry better and bigger every day and that their company is profiting thereby. They know that the American Electric Railway Association spends time and money collecting data which are of vital interest to every electric railway in the country—that is, most of them do, for out of all the replies received there were only two companies which even by inference implied that the association was not doing good, efficient, constructive work.

Some of the companies are small companies who feel that they cannot afford even $50 dues per year. Some of the companies are in receivers' hands, and feel that they must husband all their resources. Some of the companies are affiliated with other companies in such a way that all data and many other benefits of the association are accessible to them. Some companies do not even have a plausible excuse for being non-members.

There are, of course, non-member companies which we all agree have good reasons for not joining at the present time, but far too many of them put up a straw man excuse when the real reason is that they think they are saving money by not joining, and figure that although a national association is necessary and our association is doing good work, we will continue to do what should be done nationally and that they locally can wiggle along some way and pull through without the data, assistance and inspiration which come from efficient systematic co-operation. I have a feeling both of shame and of sorrow that there are still executives in the electric railway industry who do not realize that every one of us needs all the help and inspiration we can get—and there is no better, no more economical or efficient way to receive that needed help and inspiration than to join the American Electric Railway Association.

There is no possible question in my mind but that the individual companies of this association receive direct and measurable benefits worth far more than their dues. My hope is that the committee this year has stirred up this situation enough, so that next year's committee may be able to benefit by the work which has been done this year, and which, I am frank to say, is not reflected in an increase of only thirty-nine members.

So far as the railway members are concerned, I have in my letters said little about their duty to the industry, but have dwelt upon the fact that sticks out to me so pertinently, that no railway company can in the final analysis really afford not to receive the benefits of this Association.

ATTITUDE OF THE MANUFACTURERS

Now, as to the manufacturing companies, my feeling is just this—we need their support and they need us. You can call it by any name you wish, but so far as I am concerned—and I am speaking only for myself and not the committee—a manufacturer has no right to expect to make money by selling his product to electric railway companies unless he as a manufacturer will do his fair share toward supporting the industry and this association which makes possible his sales to electric railway companies and makes possible his profits. Other things being equal, I have no desire to see business over which I have control go to a manufacturing company which is not doing its share to support our industry. So far as I am concerned, it is poor business for us to give business, other things being equal, to non-member manufacturing companies. From my standpoint, it is not fair or just when a member company pays dues to our association, comes here with its exhibits, shows and explain to us what the situation is in regard to its product, for us then to go back home and buy from a competitor who cares not for anything except the profit he may receive from the order—from a competitor who does not desire to co-operate or assist or help, but simply wants to take, and take all without giving.

We here believe in the American Electric Railway Association, and further I believe it is the duty of practically every railway company, and every manufacturing company which profits from the electric railway industry, to join the association, a duty not alone to the industry but a duty to itself.

Next year's membership committee will work hard; it will not be derelict—such committees have not been and will not be derelict—but the new members that are added to this association must come from the inspiration given by the present member companies to those now outside of the fold. Each and every member of this association should, out of a desire to help himself and to help his fellow man, consider himself as a committee of one to see that all the interests of the American electric railway industry co-operate and achieve success together.

W. H. Sawyer was again called to the platform, this time to give the report of the committee on co-operation with state and sectional associations. An abstract of Mr. Sawyer's remarks follows:

State and Sectional Associations

The first state committee on public utility information was organized in Illinois about five years ago, and it is due to the wonderful success achieved by this Illinois committee and the co-operation to others given by this committee that there are today more than a score of different committees operating in thirty-seven different states.

Primarily, the purpose of the committee is to give the facts about public utilities to the public through every available legitimate source. They disseminate information through newspapers, state public utility commissions, banking houses, public schools, and colleges, chambers of commerce, boards of trade, Kiwanis and Rotary Clubs, and similar organizations; all of them render on request special information service to individuals or societies.

Some of the committees have speakers' bureaus, and supply speakers for meetings, and all of the directors of committees maintain close personal relations with the leading editors of their respective territory. The contact between these committees and the advertising section of our own association is very close, and is within reason properly co-ordinated so that there is little or no overlapping in the efforts of the two organizations.

Practically every state committee on public utility information is healthy, functioning within reason properly, and without question doing a world of good. There are only some few of these committees which are not fully taking advantage of their opportunity, and are therefore not accomplishing the good which it would be so easy for them to do if they were given proper support by the public utility executives of their state.

My own personal experience has been that for every minute I have given to the Illinois committee on Public Utility Information, for every dollar which our company has contributed, I personally have been repaid many fold by the inspiration given me.

These committees have accomplished wonderful results, but it is not so wonderful after all when we stop and appreciate what a virgin field they had to operate in. We public utility men have been going along for a generation or so efficiently conducting our business but not taking the public into our confidence—not telling them what we had done, what we were doing, or what we were trying to do, and these committees started out to do just what some one should have been doing all the time. Better public relations is the most important question with which the public utility executive of today has to deal—the most important, barring none, for better public relations are necessary to any satisfactory solution of our problems.

Some of you have not been doing your full duty to yourself, to your company or to your industry, but in spite of that these committees have done most excellent work. The results are outstanding; we need no statistics to prove conclusively that these committees on public utility information are doing wonderful work; but they have yet an enormous task before them. We have only scratched the virgin soil and are in a position where we cannot now for one moment afford to lessen our efforts.

These committees have set a precedent and it is going to require greater effort to live up to the precedent already set and to continue the march of progress. To falter now would be disastrous, far better to have never started. Therefore, I beg of you, do not get the idea that just because these committees have done such good and wonderful work that any of us can afford to allow a slackening up. We must all put our shoulders to the wheel and give them more support than we ever gave them.

Edwin C. Faber, in the absence of the chairman, L. S. Storrs, presented the report of the committee on publications, which was most complimentary of the great improvement made in the magazine *Aera* during the past year.

E. F. Wickwire, secretary Ohio Brass Company, Mansfield Ohio, reported in his inimitable and humorous way on the work of the committee on co-operation of manufacturers. This follows in abstract.

Co-operation of Manufacturers

An article in *Aera* for August described the work of the committee up to the middle of July, so it will be necessary only to mention the high points of things done this year and to say a few words about developments since the article referred to has been printed.

We have continued the publication of *Truth*, which contains items about electric railways suitable for posting on bulletin boards, or to be used in house organs and local newspapers. We have issued a little sticker which goes on the letterheads and order blanks used by the purchasing departments of our manufacturing members. It is just an entering wedge, but we are going to evolve further means of enlisting the interest and support of the many concerns who furnish raw materials and supplies to our member companies. The sticker reads:

"You have a dollars and cents interest in the welfare of the electric railways because a large share of the material we buy from you becomes a part of products which are sold to traction companies. Therefore, help them to get fair fares—reasonable regulation—an even chance for success."

It will reach many thousands of companies which have not realized their "dollars and cents" interest in the electric railway industry, and it is bound to create a favorable impression in a field that we have scarcely touched heretofore. This is just another application of the good old motto that "the constant dripping of water wears away the hardest stone."

In August *Aera* an honor roll was printed which carried the names of about seventy manufacturers who were participating in the work. Following an intensive mail canvass of manufacturers, there are now more than a hundred co-operating companies on the roster. The same article outlined an idea for a poster campaign. This campaign has now been launched and shows signs of being the best result getter which this committee has been able to devise.

The opening broadside was fired on Sept. 20, when Poster No. 1 appeared all over the country in street cars, in waiting rooms and on factory bulletin boards. Never has such a response come in for any material which has been offered by the association. The original printing order was increased again and again, and many companies pledged their whole-hearted support. Not a dissenting note in any of them.

This poster was followed Oct. 1 by Poster No. 2, which depicted "600 pounds of conductors," and these men, multiplied several thousand times, threw their weight into the fight for the industry on that date. This poster idea is a practicable and forcible way of reaching the people, although to some it may seem almost too simple. But we must remember that we are trying to appeal to the intelligence of the masses. The good old adage about "aiming high" is all right, but in this case we had better "aim lower" if we want to hit the mark that we're trying for.

The committee feels that the overwhelming response to the poster series is a good indication that the psychology of the plan is sound and that it will go far toward accomplishing our purpose, if it is supported throughout the land —and it's up to every one of us to see that this is done.

This is a method of reasoning with the public, instead of arguing with them. We in the manufacturing business realize that usually if we win an argument with a railway man we lose the order. Let's profit by that little trait of human nature in the matter of our industry's relations with the public and not try to win our case by arguing.

We know that the electric railway has been hampered by adverse public opinion. Many men will actually inconvenience themselves if they think it will injure the electric railway. Some politicians and newspapers have been radical in their attitude toward the electric railway industry, and against everything that the industry has tried to do. Isn't this antagonistic attitude on the part of so many people largely due to a misunderstanding of our industry?

We have evidence which indicates

that the average man carries around a mental picture of Mr. Electric Railway which inspires anything but friendliness. We asked an artist to paint his conception of Mr. Electric Railway. He produced a portrait of a pudgy individual with a fat tummy, a silk hat and dollar signs all over his anatomy. Do you wonder that people are unfriendly if they are carrying around some such mental picture as that of Mr. Electric Railway?

Contrast that conception with the same artist's idea of Mr. Bus Man. This time he sees a friendly, sociable fellow, who may live next door or upstairs or around the block, and a man who has overdue bills and troubles and babies, just like he has himself.

Why doesn't the public recognize that our industry is essentially an industry in overalls? Why don't the people realize that the group of men which receives the largest slice of the money collected by traction companies is made up of the armies of workmen, who build and maintain the track, rolling stock and lines, who make the juice and run the cars—plus the legion of factory employees who make materials for the electric railway industry. Let's get the picture of the friendly man with overalls into the minds of the people and we will find a much different feeling on the streets and at the polls. We believe that it is possible to get that idea across if we combine our efforts in this movement and make them continuous. The public is busy these days and it's hard to make a lasting impression.

It is the nation-wide scope of this campaign that is going to get the results we are after—the adoption of the same tactics that are successfully used to sell tires, chewing gum and cigarettes. Your committee wants to emphasize the idea that the use of these posters must not only be widespread, but it must be sustained.

Favorable statistics will follow favorable public opinion as surely as the tail pursues the dog. The experiences of such cities as Des Moines, Iowa, and Saginaw, Mich., are convincing people that the electric car is an essential form of transportation in a wideawake city and that buses may have their place, but it is not in the place of the trolley car. Improved facilities of the interurbans, particularly in the direction of increased speed, safety and comfort, will not only enable them successfully to compete with the steam roads but gradually to eliminate inferior bus competition. There is more ahead of the electric car today than a safety fender.

Enough progress has been made by the committee to show that the work is valuable and that it warrants a place as a definite part of association activities and a larger organization to carry on the movement. In fact, the surface has scarcely been scratched. Just imagine the results which can be obtained when the full strength of the industry is mobilized and subject to call for instant action. Think of the effect of having the ranks of the railways and the manufacturers organized into a legion which would present a solid front, lined up to fight against unfavorable legislation. The committee hopes to accomplish these things. We have been organized less than two years now, but feel that a real start has been made toward our objective.

The report was signed by R. E. Adreon, George O. A. Barnes, W. D. Blatz, C. R. Ellicott, E. C. Faber, J. C. McQuiston, E. B. Meissner, George R. Rowland, P. L. Thompson, E. P. Waller and E. F. Wickwire, chairman.

Edward Dana, Boston, briefly abstracted the report of the committee on education as follows:

Education

The outstanding feature of the year's work of the committee on education, as covered in its report, was the securing of definite co-operation on the part of a large number of member companies. This took the form of the appointment by seventy-six companies of representatives charged with the responsibility for studying local educational needs, co-operating with the committee on education and putting into operation such plans as prove practical. It was decided early in the year to confine attention to the following five lines of effort: (1) An explanation to executives of member companies of just what the committee aimed to do. (2) An appeal for the appointment of an official or a committee to take up local work earnestly in co-operation with the committee on education. (3) Provision for the delivery of the message of the committee on education to various sections of the association. (4) Getting into direct contact with the educational work being carried on in the industry now. (5) Consideration of the advisability of the association delegating one man to supervise and correlate the educational work of the committee.

For the convenience of member companies, the committee divided the educational problem into the following three component parts: (1) Educating present non-technically trained employees for supervisory positions. (2) Training trade apprentices. (3) Co-operating with technical schools to assure a supply of technically trained recruits.

As to practical things which can be done the following were listed: (a) Participation in co-operative courses with the universities and colleges. (b) Co-operation with high schools and trade schools in either day or night courses. (c) Co-operation between electric railways and large manufacturing industries, including exchange of employees. (d) Conducting classes on the university extension plan. (e) Arranging for periodic staff meetings and series of lectures and instructions on local properties. (f) Providing company section and other educational lectures and discussions on company properties. (g) Provision of shop and departmental apprentice courses. (h) Distribution of company and association literature of an educational nature. (i) Americanization work for the benefit of foreign-born employees. Substantial progress, the committee stated, is being made along these lines in several states.

The committee interested itself in securing the publication of articles relating to employee training and appended a bibliography to its report. Attention was also drawn to a suggested outline of two courses which have been prepared as a result of a conference held at the eighth annual engineering extension convention of the Pennsylvania State College during May, 1923, on the subject of educational courses for public utility employees. In view of the fact that there is an association of the institutions conducting extension courses, it should be possible for such courses as are now being tentatively developed at the Pennsylvania State College to be made available for railway employees in practically any state in the Union. The courses referred to comprise a general one, intended to teach employees the economic conditions under which their companies operate, and a trainmen's course, dealing with shop practice, maintenance, apparatus, testing, supervision, etc.

The committee expressed itself as optimistic over the progress which has been made to date and confident that the importance of educational work has now become appreciated, so that permanent results must come, slowly, to be sure, but in a substantial manner. All member companies, large and small, were urged to appoint representatives to work up educational programs, to analyze last year's report and actively to become associated through the educational committee with the carrying on of this work.

The report was signed by E. J. Blair, Thomas Conway, Jr., C. B. Fairchild, M. B. Lambert, M. McCants, H. H. Norris, A. F. Perkins, F. R. Phillips, T. P. Pulliam, J. V. Sullivan, W. Von Phul, H. E. Weeks, T. S. Wheelwright and Edward Dana, chairman.

Henry C. Spurr, editor *Public Utility Reports*, addressed the association on various aspects of the utility situation. An abstract of his paper appears elsewhere in this issue.

President Emmons, as chairman of the Charles A. Coffin Prize Committee, then read the committee's report announcing the award of the prize. The report, comments of the President and the response of the recipients appears in the front part of this issue.

RELATION OF MANAGEMENT TO EMPLOYEES

The last feature of the program of the American Association consisted of two addresses on the subject "Relation of Management to Employees." The first of these was by Dr. C. A. Lippincott of the Studebaker Corporation, South Bend, Ind., who has devoted a great deal of attention to employee relations and has shown real accomplishment in that respect with the 200,000 Studebaker employees. An abstract of his address is presented elsewhere in this issue. The second address was by Elisha Lee, vice-president Pennsylvania Railroad System. Mr. Lee gave a pointed discussion on the principles of management-employee relations on the Pennsylvania System and told of the progress there. His address is also presented in abstract elsewhere in this issue.

The committee on resolutions submitted a report expressing the thanks of the association to the public utility commissioners and other speakers, referring particularly to its pleasure "at the cordial support and co-operation expressed in the addresses by the representatives of the automotive interests" and hoping that this "is indicative of even closer relations in the future"; to the convention committees which prepared reports for the convention; to the committees in charge of the convention itself, including the exhibit director; to the exhibitors themselves for their wonderful record-breaking display; to the pier contractors and others in Atlantic City who had been especially helpful, and to the president and other officers of the association for their services during the year to the association "and through it to the entire railway industry." The report was signed by J. G. Barry, H. W. Blake and A. W. Brady, chairman.

A committee consisting of General George H. Harries, chairman; Charles L. Henry and Robert I. Todd then escorted the new president and four vice-presidents to the platform, where they were presented to the association by the retiring president, C. D. Emmons. In accepting the gavel symbolic of his presidency President Budd said he did so with a full sense of the responsibility and at the same time with full hopes of seeing the association and the industry continue in improvement of service and success. With the record of courage and accomplishment, in the face of almost every imaginable difficulty, which the railways showed during the war, with the stable position they have now regained in spite of many handicaps, the industry may be sure, said President Budd, that there can be no future difficulty it will not conquer. The four vice-presidents also made short talks, pledging their best efforts to make the coming administration a success.

The convention then adjourned *sine die.*

Exhibits More Numerous than Ever Before

NOT only in quantity but also in quality the manufacturers' exhibits excelled those of previous years. There were 167 individual exhibits, occupying 75,556 sq.ft. of space on the Pier and 374 sq.ft. outside. An interesting feature was the amount of space occupied by various motor bus manufacturers. A touch of humor was added by the presence of original Toonerville Trolley, used in the making of moving pictures of the well-known cartoons of Fontaine Fox. In that connection it was noticeable that a number of exhibitors, who were prevented by the nature of their products from displaying them on the Pier, used moving pictures to show those interested the working of the apparatus. The manufacturers showed much originality in their displays and arranged the equipment in a very attractive manner. There was also a pleasing harmony in the decorations.

Committee on Welded Rail Joints Meets

THE morning of Wednesday, Oct. 10, was occupied by the committee on welded rail joints with a meeting held on the convention pier at Atlantic City. Fifty or more engineers were in attendance and the meeting was characterized by a spirit of practical earnestness. Dr. G. K. Burgess, director of the United States Bureau of Standards, presided, and W. W. Spraragen, secretary of the committee, assisted him.

After the reading of the minutes of the last meeting, Dr. Burgess called for reports of progress being made in the laboratories where joint tests are already under way. Encouraging reports were made on the tensile, bend, drop and impact tests. A number of joints have already been tested and an exhibit of several broken joints was made during the Atlantic City meeting.

Members of the committee were then called upon to report the results of their analyses of test data for different types of joints and valuable information was given on the following: Carbon arc, electric seam; metallic arc, electric seam; thermit; cast weld; electric bar and electric butt. This work is not far enough along as yet to warrant publication of details.

Dr. Burgess then addressed the meeting on a program of future research work. He showed that great results are expected from the committee's activities, in which the Bureau of Standards is actively co-operating.

A report on the impact testing machine was presented. This machine is now due at the United States Bureau of Standards, where a small building has been erected to accommodate it. Prof. H. L. Whittemore exhibited a proposed design for the foundation of this machine, which was approved. It consists of a massive block of cast iron mounted on coiled steel springs. The joint to be tested will rest on pillow blocks, to which they will be attached by some method not yet determined. The top of the machine is curved to the radius of a car wheel and the machine is designed to duplicate as far as possible the conditions of service. At the same time all uncontrollable variables have been removed.

W. W. Wysor reported on the rotary service testing machine, the design for which is now practically complete. Details of the foundation for this machine were discussed. Estimates have been received of the cost of constructing the machine, and presumably the work will go forward promptly.

The secretary explained to the committee the financial situation, mentioning the expenditures to date and the new appropriations which have been made. He touched upon the work of his office and also some details of the several tests.

Manufacturers Move to Participate in Association's Advertising Campaign

THE manufacturer members of the American Electric Railway Association held a short meeting at 2:30 p.m. on Thursday. There were twenty-four present. E. F. Wickwire explained the ideas behind the movement of the manufacturers to participate in the association's advertising campaign to sell the electric railways to the public, so to speak. He explained that the whole idea was to drive home the thought that the man on the street and the electric railway operator, whether he be the trainman, a man in the shop or an official, were brothers.

In displaying some of the association's posters Mr. Wickwire explained the thought behind them. The campaign was a straight bid for support. There was no propaganda behind it. Mr. Average Man should be educated to a frame of mind where he will be reasonable in his attitude.

The public often had little grievances. These should be offset by popular publicity.

Mr. Wickwire said that so far as the co-operating manufacturers were concerned it did not make any difference to the association who handled the matter, but that it was difficult to separate sales and publicity. In some cases the publicity man was in closer touch with the problem than was the salesman, while in other cases the reverse of this was true.

Mr. Wickwire further said that the new officers of the association would probably arrange to have a program for the manufacturers embodied in next year's meeting. These sessions would be open, with free discussion. The manufacturers have been away from the association idea for a long time now, but Mr. Wickwire did not think that it would be difficult for them to get back quickly to closer asociation among themselves. In the case of a campaign for publicity such as he had been discussing Mr. Wickwire said it would then be possible for the manufacturers who attend the meeting to carry back the message to their own publicity, advertising or sales forces.

T. & T. Association Proceedings

Traffic Regulation, Merchandising Transportation, One-Man Cars and Bus Operation Are Among the Leading Topics—Accident Prevention Was the Topic of a Joint Session with the Claims Association

THE first session of the Transportation & Traffic Association was opened by the address of the president, Garrett T. Seely.

President Seely's Address

Careful study of what constitute the most pertinent transportation and traffic problems of the industry was given by your executive and subjects committees with the result that the subjects assigned to this year's committees are all of vital importance.

Traffic congestion in the business streets of all cities is becoming increasingly serious each year. The solution of the problem can be worked out only through the co-operation of state and city authorities with civic organizations and transportation agencies. The importance of relief from existing conditions, as well as the prevention of still more serious congestion, made manifest in the committee report that will come before you, warrants more detailed study of remedial measures by a committee in the coming year.

The problem of making the services of the street and interurban railways more attractive to our customers will be presented forcefully in the report of the committee on merchandising transportation. This report will contain much of interest to all of us, the committee developing its study along five main lines of thought.

The use of the weekly pass, or the form of quantity-ride selling, has been extended during the year in an effort by various companies to increase riding through a change from the old stereotyped cash and ticket fare. The importance of the committee's study of this phase of the problem of merchandising is reflected in the fact that where only one company used such a method in 1919, there are in 1923 thirty-five companies which either have it now in effect or have had it in effect.

An especially interesting phase of this same report is the chapter devoted to car design from the standpoint of merchandising transportation. The tendency in the design of cars, as gathered from replies to a questionnaire sent out by the committee, is toward more comfort for passengers, easier entrance and egress, more comfortable seating, better lighting and the like, lower floors with fewer steps, more attractive cars, both as to exteriors and interiors, and the elimination of signs, even sometimes of advertising.

Garrett T. Seely
Retiring President

Merchandising by advertising, utilizing employees for selling and other phases of the development of passenger, freight and express business are ably considered. The value of the committee studies in the last several years of this phase of the transportation business is apparent, and this subject is one which may well warrant still further attention in the year that lies before us.

The use of the one-man car in city operation has become standardized. Its advantages are thoroughly recognized. There are many suburban and interurban routes as well that are adapted to one-man operation, and the field for this method is extending from year to year. Through scientific car design a type of car is developing which fulfills service requirements, is comfortable and attractive, and, through its light weight, lower platform expense and reduced power and maintenance costs, brings the total costs of furnishing attractive and adequate service down to, or within striking distance of, the irreducible minimum.

The past year has seen sufficient development of the use of buses by electric railway companies as auxiliary to their car service to yield for the first time for the study of your committee definite facts of costs and operating conditions. The report of this committee will merit your closest attention, developing carefully and concisely as it does the study of the classes of bus service operated, the reasons for the inauguration of the bus service, the type of equipment used, operating and maintenance methods, rates, transfer arrangements and accounting methods, as well as the operating results and the effect of operation on public relations.

J. K. Punderford
President-Elect

This phase of transportation has attracted such wide attention from the public that it is one which must command the careful consideration of every transportation man in the coming year, undoubtedly being a subject that will well repay further earnest study by a committee of this association.

Finally, we have the ever-important subject of accident prevention, which will be presented in a report resulting from a joint study of the causes of accidents by committees of the Claims Association and this association. This study brings consideration of this all-important topic to a still higher plane in the continuation of the excellent committee work of former years.

Every one of these reports should be fully discussed from the floor of this convention. The committee work is the mainspring of association progress. Ours has been a rapidly developing industry and it is chiefly through the work of the committees that this development has been guided. It is highly desirable therefore that any of us who may be able from our experience to add to the sum of information brought out in these reports should do so. I sincerely hope that none will hesitate, or await urging, to "speak out in meeting" and make the discussion of these vital matters complete and instructive.

Ours is the essential business of furnishing urban and interurban transportation. This association represents the phase of that business that has for its particular field the rendering of service and the selling of service to the people of our various communities. We must sell that service to a sufficient number and in such manner as to fulfill our quasi-public nature and at the same time to make our service remunerative as a business.

Report of Secretary

Because it consisted only in an abstract of the minutes of its meetings the report of the executive committee was not read. In the report of the secretary, Mr. Welsh called attention to the fact that the committee personnel is widely distributed geographically, making each committee fairly representative of the industry. Although it is not possible on this account for some of the more distantly located members to attend meetings regularly, their assistance and co-operation was obtained through correspondence. He emphasized also the difficulty of obtaining answers from questionnaires, and asked for increased co-operation to get results by this means. The number of answers received during the past year was discouragingly small in proportion to the number of questionnaires sent out. A statement was made also of the gains and losses in the number of members of the association during the year and the need of building up the membership was emphasized.

On the committee on resolutions, the president appointed J. E. Wayne, vice-president and assistant general manager York Railways, York, Pa.; M. McCants, assistant general manager Market Street Railway, San Francisco; C. L. Van Auken, editor *Electric Traction*. The committee on nominations was composed of C. E. Morgan, vice-president and general manager Brooklyn City Railroad; L. H. Palmer, general manager United Railways & Electric Company, Baltimore, and James P. Barnes, president Louisville Railway, Louisville.

The report of the committee on traffic regulations was read by H. B. Flowers, president New Orleans Public Service.

Traffic Regulations

The committee on traffic regulations, at the one meeting held during the year, decided that the committee should reinvestigate traffic conditions throughout the country. The effect of parking especially should be noted, as well as steps taken by various municipalities to cope with it.

As the result of this study it has been found that congestion of traffic has increased everywhere. There is scarcely an incorporated village or hamlet that has not its traffic problem the same as the cities of the first class. In each case it is strictly a local problem, but the statement for each is the same, "How may we best utilize our streets, roads and highways to handle the constantly growing traffic which must use them?"

Street cars carry the bulk of passenger traffic. In fact, the average surface car line more than carries the population of the community which it serves daily. That fact should be recognized in all regulations affecting traffic in which street cars are a part.

We have passed through the time of the making of traffic regulations. Many of the rules necessary to the rapid and safe movement of traffic are now almost as universally applied, understood and obeyed as the rule of keeping to the right.

The many remedies for eliminating congestion have been or shortly will be of like universal application. Semaphores, safety zones, abolition of left-hand turns, loading platforms, traffic lanes, each and every traffic-handling device, together with the making uniform of rules in connection with their use, have helped eliminate accidents, insure a more rapid transportation and a greater public convenience, but neither singly nor together have they been able to prevent traffic congestion.

The communities served by the electric car are not fully served if the traffic congestion in these communities makes impossible the safe operation of a rapid service, and while it may be sufficient answer to criticisms of the service to say that it is the best possible under traffic conditions, the committee feels that the industry might well aid in the elimination of that congestion.

It might well have its part in the education of the public. It might place its facilities as a national industry for the gathering of technical advice and practical experience at the disposal of the various communities which its members serve.

As individuals and good citizens the operators of this utility avail themselves of their membership in the association to place at the disposal of their communities such information as the association might have bearing on that particular community's problem.

As an example of the necessity for keeping in contact with traffic conditions throughout the country, the committee cited two experiments now under way in Detroit which, if successful, will be of great interest to the industry and especially to transportation men.

In Detroit an ordinance has been enacted compelling a full or boulevard stop by all vehicles before entering or crossing some fifteen main thoroughfares. The second experiment is the making of scheduled stops in blocks of three, which is perhaps the largest elimination of stops on purely local service heretofore attempted.

The reporting to the industry of the conditions which led to these two experiments in terms of traffic and the results obtained might, in the opinion of the committee, be of the same value to the operators of street cars as the fixing of a new standard in something purely mechanical.

The report was signed by Paul E. Wilson, H. O. Butler, W. H. Maltbie, F. R. Cogswell, Frank P. Edinger and H. B. Flowers, chairman.

Following the presentation of this report, George B. Anderson, manager of transportation Los Angeles Railway, spoke of the importance of educating the public along the lines mentioned in the report of the committee. The two chief objects of traffic regulation should be to safeguard life and to expedite movement, and all provisions in traffic ordinances which aim at objects other than these must be regarded as useless encumbrances.

Mr. Anderson emphasized the point that the great mass of street car riders are unorganized and are therefore handicapped and at a disadvantage in securing the passage of such ordinances as are for their own interests. On the other hand, merchants, automobilists, and so forth are united in organizations of various sorts which are able to influence the passage of such ordinances as they desire. Railways should therefore pay particular attention to the education of the public to the end that they shall see that their own best interests are served by the inauguration of such traffic regulations as will benefit the railway.

Additional discussion of this subject was contributed by J. R. Bibbins, consulting engineer, Washington, D. C. He spoke of the rapid increase of population in our urban centers, and the even more rapid increase in the riding habit. Properly to handle the transportation problem in the face of these circum-stances will require the most expert attention to traffic regulation.

Both Mr. Anderson and Mr. Bibbins brought out the point that the removal of street railway tracks is often advocated as one cure for the transportation situation. Mr. Anderson particularly emphasized the falsity of this idea by figures, which showed in Los Angeles that the automobile traffic on streets without railway tracks was only about 40 per cent greater than on those streets where tracks existed. The ultimate result that could be hoped for by the removal of the tracks, therefore, would be to increase the capacity somewhat less than 50 per cent. This would fall far short of being a real solution. Mr. Bibbins, too, said that this was not the answer, and suggested that the T. & T. Association was the logical means of bringing home to the public attention the falsity of such reasoning. With the facts before them people would be less ready to listen with any degree of patience to the appeal of the demagogue.

The report of the committee on merchandising transportation was presented by Samuel Riddle, vice-president Louisville Railway.

Merchandising Transportation

The report of the committee on merchandising transportation is divided into five general subjects: (1) Weekly passes, monthly nickel permits, commutation tickets; (2) merchandising by advertising; (3) utilizing employees for selling; (4) car development for merchandising; (5) developing passenger, freight and express business.

No space was used in the report to urge member companies to continue their efforts to merchandise transportation, as it was considered superfluous. The committee contented itself with studying what companies have actually tried out, and a summary of these studies was presented.

Weekly Passes, Monthly Permits, Commutation Tickets—The use of the weekly pass and the monthly permit was greatly extended during the year. Where one company tried these methods in 1919, one in 1920 and four in 1921, more than a score put the pass or permit into use during 1922, and in the first four months of 1923 six other companies had inaugurated the use of one or the other. On May 7, 1923, according to a compilation made by the American Electric Railway Association, there were thirty-five companies which were then using, or had used, the weekly pass.

A table presented in the report shows that the introduction of the weekly pass, with but three exceptions among the companies furnishing information, has been followed by a reduction in the average fare per passenger. A point upon which the committee endeavored to obtain information was whether or not the use of the pass or permit had increased riding and the effect it had had on revenue. Exact figures were impossible to obtain, but the general experience seemed to be that it had stimulated riding to some extent. With one exception, all the companies had used newspaper advertising extensively at the time the concession was made, and most of them continued this form of advertising intermittently. The favorite method of distributing the pass is to have it sold by the conductors on the cars. Approximately half of the companies also sell the passes and permits at their offices.

EXPERIENCE WITH WEEKLY PASS

Another pre-eminent advantage is that the pass and permit everywhere seem to have created a better sentiment toward the company making the experiment. In corroboration of this statement the following expressions of opinion received from member companies are quoted:

"The weekly pass speeds up operation, avoids arguments over fares, stimulates riding in non-rush hours, reduces work for trainmen and creates a friendlier feeling."

"The weekly pass has eliminated jitney competition and made the company more popular."

"The advantages for us have been good will and no request for a lower fare."

"We think we have received the good will and co-operation of the public by the reduction in fare made possible."

"The advantages are an increase in non-rush hour riding, an increase in the riding habit, and the fact that it does not necessitate additional service, creates good will and gets a dollar from a man who otherwise would pay less."

"In times past the persons who used our cars most frequently had the most complaints to make about our service. such patrons seeming to feel that their heavy outlay for fare gave them a better right to kick. The weekly pass has made this class of patrons our firm friends, and even a hostile mayor is not able to get a rise from the public in response to his denunciation of us."

Merchandising by Advertising—Merchandising transportation by the printed word is growing very rapidly in the electric railway industry. The number of companies advertising, in one form or other, is now, according to the report of the committee, approximately 300, whereas three years ago not one-tenth of this number were using advertising. More, however, should be advertising.

In studying the advertising that electric railway companies are now doing, it was found that there are four mediums being utilized to varying degrees. These are newspapers, display cards inside the cars and car-window posters, display cards or dash signs outside the cars, and weekly, semimonthly or monthly publications in pamphlet form, to be placed in racks or holders inside the cars.

The use of display signs inside the cars has been found very effective in bringing to the attention of passengers matters of policy, measures of safety and details of operation practices. All this tends to create a psychological reaction in favor of the railway.

Many companies utilize window signs for good will advertising. This space is the most preferred of all positions, because it is possible, by printing the signs on both sides, to reach not only the car rider but persons outside the car who are walking or riding in other vehicles. This space is always available to companies, without cost, for it is never included in contracts with car-advertising companies.

The committee expressed the belief that no more valuable means of stimulating travel exists than by the use of properly worded and attractive dash signs. These may be utilized to give publicity to every legitimate form of amusement, public and church gatherings and special events.

Many electric railway companies are now providing weekly publications for car riders in "Take One" boxes. It is advisable for such publications to be in small pamphlet form, and they should carry an amusement directory of the theater attractions of the city. Experience indicates that they should not be filled with company propaganda.

Utilizing Employees for Selling—"The handling of the car by the motorman and the treatment of the passengers by the conductor play a most important part in so satisfying patrons as to develop future business." The truth of the foregoing statement is so well established that it requires no further exposition. The real crux of the problem, however, is the manner in which motormen and conductors can be trained to be efficient, courteous, neat and generally pleasing to the patrons with whom they have to deal. The biggest obstacle to be overcome is the fact that the ordinary platform worker does not himself know what his company's problems are. One southern railway has done much to gain the good will of its public by means of the appointment of a committee of nine trainmen to study the merchandising of service. The committee suggests that many members of the association, by following in the footsteps of this southern railway, may improve the manner in which they are utilizing their employees for selling.

Considered purely from the angle of the effect that the platform man has on selling transportation, however, the committee believes that there are four qualities every good conductor should possess, and that there are three that every good motorman should have. These, it is believed, railways have a right to demand of their employees, and, what is more important, a chance of obtaining to varying degrees. These qualities for a conductor are good nature, personal neatness, general knowledge of the streets and buildings in his city and intensive knowledge of the part of the city through which his own line operates, and a good voice. For the motorman, the first two qualities are the same and the third is ability to start, operate and stop his car smoothly and easily.

The committee believes that the knowledge of what to do is not sufficient without the desire to do it, nor is the desire sufficient without the knowledge of what to do. The report outlines a list of eighteen possible cases where friction was likely to occur between the trainmen and the public, and suggests, in a general way, the best method of handling each case. Platform men should be impressed with the fact that the passenger is always right. Controversies arise in actual practice more frequently over transfers than over any other one thing. If the conductor and the passenger both are persistent, one of two things happens. The passenger either pays another fare or is put off the car. In either case, the company has not only made an enemy of the person affected but, because of some peculiarity in human nature, is certain to have alienated the sympathy of the majority of those who heard the controversy. It is better for the conductor to listen to the passenger courteously and then, even though the passenger is wrong, politely to drop the argument.

Car Design from the Standpoint of Merchandising Transportation — The report describes several pronounced tendencies in the design of new cars. There is a tendency to greater comfort, with easier entrance and egress, more comfortable seats of greater length and width, with a better type of upholstering, greater distance between seats, armrests, better lighting, low floor levels requiring few steps to the car floor, ramps rather than steps between platforms, better windows, with plate glass in some cases, and a free, open outlook from all sides, more pleasing interiors and exteriors, and the elimination of signs, often the elimination of advertising as well.

Another general tendency is toward lighter weight for economy. This, fortunately, fits in well with the tendency for comfort, as a low-level floor allows of a lighter truck and less swaying from side to side. The lighter truck also allows the use of lighter motors and simpler control. This all, in turn, makes possible faster acceleration and braking, which then makes possible the maintenance of scheduled speeds with lower, free-running speeds, a desirable situation from many standpoints.

Features of the most recent cars of a number of railways are described in some detail. The results of a number

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Members of Executive Committee with Terms Expiring in 1926 of questions sent out to member companies are also presented. One of the most interesting is the indication that the standard Birney safety car does not meet with great favor, unless modified in certain respects. The principal feature is that double doors are required and the cars should be made more substantial.

There is a tendency to eliminate mandatory or "rule" signs altogether. In such cases the personal conduct of the passengers is left up to their inherent decency. Smoking in the rear of the car during the part of the year when the windows are all open may take place in such instances.

Another point made is that center lighting is very satisfactory when shades of the proper design are provided. The glare is less and the reflection on the motorman's window is less on open vestibule cars.

Developing Passenger, Freight and Express Business—In general, the answers to the committee's questionnaire on this subject were not satisfactory. No attempt was made to set forth the methods used on urban railways to stimulate passenger business. Only the methods of the interurban line are mentioned. The replies indicate that time-table folders are considered the best form of publicity. Other forms used are descriptive and lithographic circulars, newspapers, car cards, billboards and posters.

The main features in building up passenger traffic are fast, reliable service, good, well-painted cars kept clean and sanitary, a good roadbed, courteous crews on trains and agents that can give reliable information and prompt service.

The report was signed by H. H. Brown, G. Sabin Brush, Frank L. Butler, R. F. Carbutt, John F. Collins, John A. Dewhurst, Samuel W. Greenland, M. McCants, A. W. McLimont, Richard Meriwether, E. B. Moore, F. D. Norviel, O. A. Smith, T. H. Tutwiler, C. L. Van Auken and Samuel Riddle, chairman.

Discussion

S. W. Greenland, vice-president and general manager Indiana Service Corporation, outlined the study which was made of the weekly pass. Walter W. Jackson, consulting engineer, and W. H. Boyce, general manager Beaver Valley Traction Company, discussed this phase of the report. Mr. Jackson analyzed some of the reasons why the weekly pass after being installed has been retained on some properties and discarded on others. Several fundamental requirements were listed as being necessary to a successful pass installation. The community must be of a size to allow the encouragement of non-necessity riding; a sufficiently frequent service must be provided to build up more general short riding; the program for the installation of weekly passes should also include an improvement in the service; the pass must not be too high in price and it must be effectively and continuously advertised.

Several examples were given of instances where the pass was installed and then abandoned, either because the property was so small or was in such condition that the pass could not save the situation. Failure to apply the proper kind of pass to meet a specific combination of conditions was also pointed out as a cause for the discontinuance of the weekly pass scheme on some properties.

Mr. Boyce discussed the results obtained with the pass on the Beaver Valley property and described the zone system in use. A progressive scheme of monthly "bargain" sales, in which the three-zone or "system" pass is sold at reduced rates, illustrates in a striking manner the application of general merchandising principles to the sale of transportation. A reduction in the price of the system pass from $2 to $1.50 doubled the sales of this pass in a very short time.

The work of the committee on merchandising by advertising was put before the association by Frank L. Butler, general operating manager, Georgia Railway & Power Company. The discussion of this phase of the subject emphasized the necessity for intelligently planned advertising. Contact with the public by frequent insertions was held to be important. The practice of having advertising copy prepared by the same department which handles complaints was recommended as a proper means of getting the correct viewpoint into the advertising copy. It was also held that copy written with a view to developing human interest stories maintains a proper contact with the public and gives the desired results. This same idea was brought out further in the discussion by the use of the expression, "The advertising should personalize the service."

In addition to reading excerpts from the portion of the report dealing with the utilization of employees for selling, M. McCants, general manager Market Street Railway, San Francisco, discussed the report. Mr. McCants took exception to the unqualified use of the slogan, "The Passenger Is Always Right." He maintained that this policy may frequently lead to the adoption of the easiest way out of a controversy rather than the best way from the standpoint of dividends, as well as good will. Standardization of verbal expressions to be used by platform men in avoiding passenger disputes was held by Mr. McCants to be of considerable help in connection with this difficult matter. He emphasized the fact that the interest of the men must be aroused.

The difficulty in detecting the personal characteristics of new employees in the employment office was mentioned, and it was explained that proper training and management, by helping to keep satisfied employees, go a long way toward maintaining the good natured contact with the public which is so essential to proper merchandising.

In connection with the report of the subcommittee on development of car design for proper merchandising, John W. Dewhurst, railway engineer of the public utilities management department, Day & Zimmerman, Inc., gave a brief abstract and added several comments on additional phases of the subject. He emphasized the importance of the elimination of noise in making the car ride more comfortable. H. H. Adams, superintendent of shop and equipment Chicago Surface Lines, stated that car design for proper merchandising involves an extremely broad and interesting subject. He discussed the importance of low steps and liberal platforms in facilitating passenger movement, and also described briefly the new automatic door which has been applied to one-man cars in Chicago. L. H. Palmer, general manager United Railways & Electric Company, Baltimore concurred in Mr. Adams' remarks and also indicated that proper lighting and heating are essential to the maintenance of passenger comfort.

W. G. Stuck, superintendent of equipment Kentucky Traction & Terminal Company, read a discussion on this phase of the report and also emphasized the importance of proper heating and lighting in making satisfied passengers. Comfortable seats, pleasing paint and finish, and proper arrangement for the movement of passengers, were additional factors that were discussed.

Many comments were made on the subject of building up freight and express business which was abstracted briefly by F. D. Norviel, general passenger and freight agent United Traction Company of Indiana. Mr. Norveil said that the key to building up freight business is proper service, and that although solicitation and advertising are necessary to accomplish this purpose, they must be backed up by real service to the shipper.

SCHEDULE SHOULD FIT TRAFFIC

E. H. Maggard, vice-president and general manager Petaluma & Santa Rosa Railroad, read a prepared discussion of this subject. He felt that service, personal solicitation and a good local agent are the three most important factors to be considered. In addition, the freight schedule must fit the different classes of merchandise offered for shipment. The adoption of appropriate slogans in advertising both through paid mediums and by signs on the cars and buildings of the property were held to be of considerable help in building up business. Proper terminals and facilities for handling bulky freight must be provided. Six years of experience in the application of these principles was given as the reason for the growth in freight business from 60,000 tons annually to 210,000 tons annually on the property.

This subject was further discussed by Victor S. Curtis, secretary and general traffic agent the Connecticut Company, and C. H. Hardesty, general traffic agent Monongahela Power & Railway Company, who described various practices which had been used on their respective properties for building up both passenger and freight business. Mr. Hardesty reported favorable results from the sale of party tickets at reduced rates for groups of ten or more passengers. T. J. Jay, freight traffic manager Pacific Electric Railway, described the results obtained from the establishment of joint freight rates with connecting steam lines. A growth in freight business from $1,000,000 annually in 1913 to $6,000,000 in 1923 was attributed largely to the effect of this arrangement in inducing industries to locate upon the line of the electric railway property.

Tuesday's Sessions T. & T.

The Tuesday afternoon session of the committee on transportation and traffic commenced with the report of the nominating committee, in which the following names were proposed:

President, J. K. Punderford, vice-president the Connnecticut Company.

First vice-president, T. C. Cherry, president Auburn & Syracuse Electric Railroad.

Second vice-president, G. H. Clifford, vice-president Northern Texas Traction Company.

Third vice-president, J. V. Sullivan, assistant to the president Chicago Surface Lines.

Executive committee, Edward Dana, general superintendent Boston Elevated Railway; W. H. Boyce, general manager Beaver Valley Traction Company; E. M. Walker, president Schenectady Railway, and Samuel Riddle, vice-president Louisville Railway.

The nominations were then closed and the secretary cast a unanimous ballot for those named.

The report of the committee on one-man car operation was presented by J. P. Pope, general manager Kentucky Traction & Terminal Company.

One-Man Car Operation

In its report the committee states that its scope, as originally drafted, was to apply to suburban and interurban transportation only, but that since city and suburban transportation are so closely allied, wider latitude should be given to cover all branches of the railway industry.

The committee states that, on the whole, the operation of one-man cars differs but little from that of two-man cars. But few minor changes in the rules are necessary, most of which are necessitated by local conditions. The one-man operator has to do his own switching, has to collect and register the fares and has to handle train orders by himself.

For speeding up transporation on interurban systems, the committee states that fare register registration is the quickest and most feasible method of operation; in city transportation automatic transfer machines should be considered carefully.

As to the economics of the one-man car, the committee states that the savings may be considered under four heads—platform expenses, track costs and maintenance, power costs and accident costs.

The saving in platform expense is evident, even allowing for increased compensation.

Track costs depend on the use of light-weight cars. No attempt has been made to compile information on track savings, as but few companies are operating such light-weight equipment in interurban service, and the operation has not been sufficiently extended to arrive at an analysis of the savings. Tie spacing can be increased materially. The light-cars will not crush the ties, thus increasing the life of the track structure. Less maintenance of the track will be needed, and the decrease in cost of this item should be very large if light-weight equipment is used exclusively.

Rebuilding of heavy two-man cars for one-man operation will result in no saving of power consumption, while with modern light-weight cars the saving will be very marked.

It is the opinion of the committee that the accidents occasioned with one-man cars are not in excess of, and probably are less than, those with two-man cars for the same mileage.

The committee states that the advantages of the one-man car are: Frequent service, maintaining reasonable rate of fare and safety. With regard to danger of railroad crossings, the belief is that greater safety results from having the responsibility of flagging railroad crossings placed upon the one-man operator, rather than having it divided.

It is recommended by the committee that a joint committee of the Transportation and Traffic and Engineering Associations be appointed to make a number of designs of a standard one-man car.

The report was signed by J. E. Duffy. W. E. Wood, A. Swartz, L. G. Van Ness, A. L. Reynolds, H. C. DeCamp, K. A. Simmon, N. W. Bolen, G. H. Clifford, T. C. Cherry and J. P. Pope, chairman.

In discussing this report, C. E. Morgan, vice-president and general manager Brooklyn City Railroad, spoke of the success of one-man operation in that city. It was found that the average trainman preferred to operate a car alone rather than to have an additional man to collect fares during the rush hour. On thirty-eight lines in Brooklyn where one-man cars are operated there has been necessary an addition to the running time in only two cases, although during the same period every two-man line has had to increase its running time. One-man cars operate on the same streets with cars of other types through the heaviest kind of traffic. Mr. Morgan disagreed with the report of the committee in so far as saving power is concerned and said that there was a very noticeable saving with converted one-man cars in Brooklyn.

J. B. Stewart, Jr., general superintendent Youngstown Municipal Railway, described the method by which large cars of various types have there been converted for one-man operation.

President Emmons of the American Association expressed his gratification at the great success of the convention and said that he thought it was in no small measure due to the interest displayed by the members of the various affiliated associations.

Continuing the discussion of one-man car operation, Mr. Riddle described an interesting method of numbering stations on his property. This was done for the sake of simplifying the arithmetical calculation necessary to compute the fare.

The report of the committee on bus operation was presented by W. J. Flickinger, assistant to the president of the Connecticut Company. Mr. Seely asked Mr. Punderford, sponsor for the committee, to preside during the presentation of the report. An abstract of the report follows:

Bus Operation

It is generally conceded that there is a place in the present transportation fabric where the motor bus can be used to advantage. Public authorities have gradually brought order out of the chaotic conditions which the competitive jitney introduced in the transportation field seven or eight years ago, and many communities have now accepted the motor bus as an auxiliary to existing transportation facilities. The electric railways are also becoming increasingly interested in its use in meeting the full requirements for transportation in the territory which they individually serve.

The report of the committee consists largely of a review of what is being accomplished by various member companies operating motor buses. Information is presented to show the class of service operated. This indicates that, of seventeen companies reporting, seven operate supplementary service, twelve feeder service and nine independent service. Looked at in another way, seven of the companies operate exclusively on city routes, four on suburban lines, two in interurban service, two in city and suburban service, one in city and interurban service and one in city, suburban and interurban service. The base operating schedule calls for 185 buses, while the peak requires 225 vehicles. On the average, each bus travels 134 miles per day, while the individual mileage reported varies from 70 to 216 miles.

An analysis of the reasons for inaugurating bus service indicates that all of the seventeen operating companies are quite closely following the principles laid down in the 1922 report of the committee. This means that if a railway company adopts the policy of providing all transportation needs in the territory served the possibilities of the bus as an aid to such policy cannot be overlooked. As for supplanting existing rail lines with bus routes, this is a problem of economies, but it will be found that when rail lines with low earning power are faced with heavy rehabilitation or paving charges the bus can be used as a means of continuing service with an expenditure for equipment much below the cost of plant renewals or paving. A summary of the replies given as to the reason for bus operation shows that eleven undertook operation in order to hold a monopoly of transportation in the territory served, two companies have supplanted their rail lines with bus routes because traffic has failed to meet investment charges, two companies are using buses to provide a shorter and quicker route, one company operates buses to keep out competitors and, one has used buses to avoid excessive rehabilitation charges.

Types of Equipment.—The type of motor bus equipment used indicates the twenty-five-passenger bus to be the most favored, with the fourteen- and eighteen-passenger vehicle following in the order named. The type of chassis most commonly operated appears to be the White Model 5, which nine companies report using. Five companies have Reo and Republic, while four report Mack. Other types are not used by more than one company. Pneumatic tires are reported in thirty-one cases, and in nine cases duals are used on the rear wheels, while cushion or semi-pneumatic tires are used in only ten instances. Weights of buses per seat calculated from the table given in the report indicates as follows:

Passenger Capacity	Weight of Bus (Lb.)	Average Weight per Seat (Lb.)
13	4,950	380
14	3,000–7,200	215–514
16	4,350–5,500	272–344
18	4,500–9,000	250–500
19	8,430	444
20	6,000–7,920	300–395
21	7,000	333
24	6,480	270
25	8,130–10,000	325–400
27	6,100	226

Step heights on one-step buses vary from 14 to 20 in. from the ground to the tread of the first step with a riser of from 8 to 14 in. to the floor level. In case of a double step the second riser is 9 to 9½ in.

The committee in discussing design of vehicles says: "If we are going to sell to the public the idea that street railway companies should be given the opportunity to furnish the entire transportation service, the importance of having the proper equipment to provide the greatest amount of safety, comfort and convenience cannot be too strongly emphasized. It is pleasing to note that street railway companies are discarding the truck chassis and adopting the improved types as rapidly as the builders are developing them."

In the further development of the chassis, simplicity and accessibility should be the chief aim of automotive engineers. It should be borne in mind that ordinary running repairs are made without removing the body and, therefore, easy removal and replacement of parts from underneath the chassis should be made possible. It is very desirable that time out of service be the minimum. A unit repair system will best meet this requirement.

Consideration must also be given to the peculiar requirements of a vehicle operated in passenger service such as low center of gravity, clutch and gear designs for frequent stopping and starting, adequate and economical power, and spring suspension to give maximum riding comfort under varying load conditions.

This report does not touch upon body development. Each company, it is believed, will work this out according to its own requirements. In general, there seems no reason why the electric car body designs cannot be used as a base from which to develop a body which will give public satisfaction from the standpoint of safety, comfort and convenience. There will, of course, always be cases which will require specific treatment based on the particular transportation problem to be solved.

Operating and Maintenance Methods.—Where buses are operated as feeders or in conjunction with the railway service in any manner, schedules should be so laid out and maintained as to correlate the service from both facilities. This result can be obtained with the best economy if the same supervisory organization is responsible for both.

However, where a route is operated independently of the street railway service, it may be found desirable to supervise it with a separate organization.

Most of the street railway companies operating buses are doing so on such a small scale as not to warrant the increase in overhead and maintenance costs necessary if the repairs were entirely divorced from the electric car work. The committee believes, however, that this practice ceases to yield maximum efficiency and economy the moment the number of units becomes large enough to keep a separate corps of mechanics, inspectors and cleaners busy during a full working day. Bus chassis maintenance requires an entirely different line of training than that of electric car maintenance and if an attempt is made to spread the supervision and maintenance over both types of equipment, the maintenance of both will be unsatisfactory.

The body maintenance presents an entirely different situation. Bus bodies are now very closely following the type of construction used in electric car bodies and this work can be more efficiently and economically done by augmenting the regular body maintenance force sufficiently to take care of the additional equipment.

Several of the companies which have gone quite extensively into bus operation have either laid plans for or constructed garage facilities separate from those of the railway shop.

Rates of Fare and Fare Collection.—A comprehensive table showing both the railway and bus fare and the methods of collection is appended to the report. The majority of the companies are maintaining the same rate of fare on both the bus and the trolley car. Another tabulation shows that the cost of transporting a passenger by bus is greater than by trolley car, and the reasonableness of a higher rate of fare on the bus, particularly where the volume of traffic is so low that the railway will not produce sufficient volume of traffic to meet the cost of operation, or where the bus provides a more expeditious service than the trolley car.

Basis of Charging Depreciation.—None of the companies, by reason of short experience, is in a position to give definite information relative to the life of bus equipment. All of the depreciation is set up on a tentative basis with the idea of revising it, after experience, to the basis of actual conditions. So long as depreciation is recognized as a part of the cost of operation, it will make small difference under present circumstances whether it is figured on a straight line or mileage basis.

The cost of the original tires on the bus should not be considered a part of the amount to be depreciated. Theoretically the amount reserved out of revenues during the period a bus is operated should equal the original cost of the bus (excluding the tires) less its salvage or turn-in value. In all cases, where the experience is limited and the art is in a comparatively early stage of evolution, the amounts currently charged against the revenues and reserved may be considerably at variance with the actually sustained depreciation, but more extended experience will tend to improve the methods of calculating these charges.

Consideration must also be given to obsolescence and inadequacy, as well as wear and tear, in calculating depreciation charges. Physical depreciation, or the wear and tear of the bus, depends substantially on the following nine factors:

(a) The design of the bus.

(b) The quality of workmanship and material used.

(c) The character of maintenance.

(d) The efficiency of the driver.

(e) The grade and proper use of fuel and lubricating oils.

(f) The loads carried.

(g) The rate of speed.

(h) The character of service performed.

(i) The road conditions.

Because of these variable factors, it is difficult to suggest a standard practice for charging depreciation occasioned by wear and tear.

The factor of obsolescence, another element of depreciation, but not occasioned by wear and tear, should also be a matter of consideration, especially where there is likelihood of an appreciable advance in an art. At best, this is a problematical element and with respect to the bus at this stage of its evolution, at least, operators must apply indefinite theories in their calculations if they attempt to estimate it.

There enters into this study, the practical consideration that many buses, if not all, which might be replaced in regular service by better developed units could be used in extra service as spares and in regular service on lines of smaller traffic demand; often the chassis and other parts of discarded buses lend themselves to further utility.

The factor of inadequacy, is also an element of depreciation. It is a burden which operates on the income in precisely the same way as obsolescence and is as difficult to measure. The factor of inadequacy in depreciation is substantially occasioned by the traffic demands. For example, a bus with a carrying capacity of twelve might take care of all or its share of the traffic today and later, because of increasing patronage, might have to be replaced with a bus with a carrying capacity of twenty-five.

Assuming that the replaced bus, or its parts, could not be further utilized the charges against income over and above the reservations made out of revenues for depreciation occasioned by wear and tear would reflect the factor of inadequacy. This burden may be kept within bounds or eliminated in at least two ways:

First—Buses found to be inadequate in regular service may be further utilized or their major parts utilized.

Second—In establishing bus service the size of the buses necessary to accommodate the varying traffic demand and traffic growth may be reasonably determined if careful consideration is given to the fact that the bus, because of the nature of its construction and the laws against overloading which are in force in many localities, is less elastic in capacity than the trolley car.

Because of these widely variable depreciation factors, each company must study its own situation and from future experience develop such method as will adequately provide for renewals or replacements as they become necessary.

Depreciation on garage building and equipment must also be taken into consideration. As these facilities do not vary considerably from those generally used in railway operations it is safe to assume the same rate of depreciation in both cases.

No standard practice for providing for accident liability is suggested. Of the seventeen companies giving information, six set aside from 3 to 6 per cent of their gross revenue. In other cases the requirements as prescribed by law, either state or municipal, are followed. Generally speaking, each bus carries $1,000 property damage and $5,000 and $10,000 liability insurance for any one injury or accident.

Attitude of Public—With one exception, the attitude on the part of the public favors bus operation by the street railway companies. This indicates, that the public is showing a preference for dependable service by a responsible, experienced transportation agency to that furnished by an agency whose interest in transportation ceases immediately when profits disappear.

It is also recognized that through supplementing the rail service with buses additional territory is being served which could never hope to receive service from individual bus operation without a guarantee of immediate profit.

A very influential New England newspaper goes right to the heart of the matter in an editorial which says in part:

"Certain kinds of public service are essentially monopolistic, and transportation is one of them. It is as unsound economically that there should be two gas companies, two electric light companies and two telephone companies as that there should be two street railway companies, or, which amounts to the same thing, one street railway company competing for the transportation business of the community with a number of bus lines serving precisely the same districts.

"The right solution is to give one company monopoly of transportation and then see to it that it fulfills all the obligations that go hand in hand with monopoly.

"The motor bus is a valuable agency of transportation, but it should be employed as an auxiliary to the system of transportation that constitutes the main source of reliance, instead of being a competitor of that system. As a flexible unit its primary purpose should be to serve territory not at present served by the street cars."

The tabulation of operating results presented represents a picture of what may be expected in the furture. Certain elements of cost are as yet indefinite. None of the companies has been operating buses much longer than a year, consequently, their maintenance costs have had an advantage from the fact that their equipment was new and did not require heavy expenditures for repairs and renewals. It is quite possible also that the change from the truck chassis to one designed for passenger transportation may result in a decrease in this item.

So far the bus has had the advantage over the electric car by reason of the fact that the roadbed has been provided and maintained out of the general tax fund, but as the question of commercial use of highways is at present being given serious consideration throughout the country, it is entirely probable that the item of taxes will sooner or later be materially affected through changes in methods of taxation.

The most important factor to bear in mind in comparing the cost of bus operation with that of electric car operation is that, by reason of the smaller seating capacity of the bus, the cost per passenger is considerably higher than for electric car operation. The average cost per bus-mile, including

OPERATING RESULTS PER BUS-MILE

Company	A	B	C	D	E	H	I	L	K	O^1	O^2	R	Weighted Average All Companies,
	1-1 23 to 5-31-23	1-1-22 to 3-31-23	7-1-22 to 3-31-23	5-26-22 to 3-31-23	1-1-22 to 3-31-23	3-1-22 to 3-31-23	1-1-22 to 3-31-23	12-1-21 to 11-30-22	7-3-22 to 3-31-23	7-15-22 to 12-31-22	1-1-22 to 12-31-22	4-1-22 to 3-31-23	
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Transportation revenue	26.50	21.18	28.67	13.42	25.99	25.25	19.23	6.11	20.84	29.79	17.41	26.28	21.18
Other revenue	....	....	.60	.04	....	.02	.06	....	.04	.86	.51	....	.21
Total revenue	26.50	21.18	29.27	13.46	25.99	25.27	19.29	6.11	20.88	30.65	17.92	26.28	21.39
Maintenance (excluding depreciation and tires)	3.83	1.95	4.50	1.62	3.02	6.56	4.00	2.62	5.42	6.71	2.97	2.61	4.20
Tires	1.50	1.94	1.49	1.32	.85	2.48	2.43	1.87	1.65	2.50	1.51	.47	1.88
Depreciation	3.00	2.68	3.88	3.25	2.29	3.96	2.67	7.19	8.05	2.87	2.68	1.03	3.08
Wages of bus operators	7.68	5.65	6.49	6.09	7.03	6.91	6.05	6.43	5.64	4.55	3.82	6.04	5.74
Other conducting transportation expenses	4.83	3.26	10.19	5.84	7.18	7.67	5.06	4.60	7.01	3.33	3.29	7.21	5.95
Injuries and damages, insurance, other general expenses	3.25	2.52	3.44	.77	6.56	3.04	3.93	.57	.74	5.32	3.64	2.56	3.10
Total	24.09	18.00	29.99	18.89	26.93	30.62	24.14	23.28	23.51	25.28	17.91	19.92	23.95
Net operating revenue	2.41	3.18	*.72*	*5.43*	*.94*	*5.35*	*4.85*	*17.17*	*2.63*	5.37	.01	6.36	*2.56*
Taxes	.92	.25	2.10	.60	.15	.24	.92	.65	.05	.18	.40	.49	.65
Operating income	1.49	2.93	*2.82*	*6.03*	*1.09*	*5.59*	*5.77*	*17.82*	*2.68*	5.19	*.39*	5.87	*3.21*
Operating ratio	90	85	102	140	104	121	125	381	113	82	100	76	112
Bus-miles	35,124	70,371	443,602	226,798	80,596	653,249	1,126,189	108,017	479,303	144,605	806,354	234,107	4,373,191

Note: Deficits are shown in *italics*.

taxes and estimated depreciation, based on the figures shown in the accompanying table is 24.6 cents. It is fair to assume the average seating capacity per bus to be twenty-five. On this basis, the cost per seat-mile of bus operation is 0.98 cents.

Data obtained from ten companies operating one-man trolley cars, exclusively, shows an average cost per car-mile of 25.7 cents, including depreciation and taxes. The carsof these companies have an average seating capacity of forty-two, resulting in a cost per seat-mile of 0.61 cents. On the basis of this comparison, the cost per seat-mile of bus operation is approximately 60 per cent greater than for the one-man electric car. These figures, however, do not include a return on the value of the property.

If this were computed on the basis of carrying capacity, the increase in bus cost per passenger would be greater by reason of the greater elasticity of the electric car. This is particularly true in localities where the number of passengers above the seating capacity of buses is fixed by law. An example of this is the state of Connecticut, where the law allows only two passengers above the seating capacity.

This not only means an additional investment which is idle the greater part of the time, but because of the smaller seating capacity of the bus, it will require at least three buses to furnish the same number of seats as two trolley cars.

The committee reports it is unable to furnish any historical data of value on trackless trolleys as experience by street railway companies is confined to four companies operating a total of seven buses and two in Canada operating a total of eight, none of which has been in service a sufficient length of time to furnish reliable data.

Another year, however, should be fairly productive of information, as the committee is informed that installations are contemplated at Richmond and Norfolk, Va.; at Philadelphia; at Rochester, and at Detroit.

The report was signed by R. R. Anderson, A. C. Blinn, W. H. Burke, A. H. Ferrandou, R. N. Graham, J. M. Ives, H. A. Mullett, L. H. Palmer, T. S. Wheelwright, J. K. Punderford, Edward Dana and W. J. Flickinger, chairman.

H. W. Alden, president of the Society of Automotive Engineers, read a written discussion of the report of the committee on bus operation, which is abstracted elsewhere in this issue.

V. E. Keenan, superintendent bus division, United Electric Railway, Providence, R. I., referred to the report as a fair and impartial treatment of a subject which has been the source of considerable controversy in recent years. The progress made by manufacturers of bus equipment in recognizing the limitations of the customary type of truck chassis for bus work augurs well for further development in bus design. The need for standardization and the use of interchangeable parts was referred to, and the advantages of co-operation between the Society of Automotive Engineers and the A.E.R.A. were emphasized. The desirability of improvements in bus design to decrease the rate of depreciation and give a longer life were also pointed out. Referring to the convention number of the ELECTRIC RAILWAY JOURNAL, Mr. Keenan agreed that close study of the results obtained in the manufacture of pleasure vehicles by the use of interchangeable parts can be profitably applied to bus design.

The steps taken by the Washington Railway & Electric Company in installing bus service as an auxiliary to its present electric railway system were reviewed briefly by President W. F. Ham. He stated that the bus can now be used in many situations where it is not profitable to build a new car line, or can be applied where it is not profitable to rebuild an old line. The advantages of the bus under certain conditions for furnishing service on extensions of existing railway lines were also mentioned by Mr. Ham. He said, however, that a transfer charge between bus and cars is very desirable.

A brief description was given by G. B. Anderson, transportation manager Los Angeles Railway, of the steps taken by his property in the establishment of bus lines to forestall competition by independent companies. He said that although a transfer privilege is in effect between buses and cars, a fare of 10 cents is charged if the passenger rides on a bus during any part of his journey.

L. H. Palmer, general manager United Railways & Electric Company, Baltimore, amplified the report relative to the operation of trackless trolleys on his property by stating that the operating costs for these vehicles were increasing rather than the reverse. He expressed the opinion that trolley bus design is far from perfected and that considerable development is necessary before it will become a practical transportation vehicle.

In concluding the discussion, Mr. Flickinger, chairman of the committee, maintained that comparison of operating costs as between buses and rail cars must be made on the basis of cost per seat, in order to give a true picture of the actual results that could reasonably be obtained.

Wednesday's Session T. & T.

The joint session of the Transportation & Traffic and Claims Associations was called to order promptly by President Seely of the former association. The report of the committee on accident prevention was presented by H. B. Potter, co-chairman. He pointed particularly to the answers to the questions regarding the most hazardous elements in the operation of cars.

Joint Committee on Accident Prevention

The study made by the committee on safety work last year was continued by a committee under the name of the committee on accident prevention, which analyzed accidents with reference to causes and the relative number in different areas on each property. It was determined that better concrete results would be obtained by the committees on accident prevention of the two associations carrying on the work jointly.

The duties of the committee have resolved themselves into two important studies: (1) Analyze accidents. (2) Ascertain the extent of the co-operation between electric railways and various public bodies.

The joint committee dropped the question of outlining the manner of conducting safety week campaigns for the reason that it is the feeling of the members that the safety week idea has been overdone in the past and that accident prevention has now resolved itself into an all-the-year-round endeavor. There is a great deal of data on this subject on file at the headquarters of the National Safety Council and the organization of the safety week has been fairly well standardized.

As a result of questionnaires sent out to member companies the joint committee has obtained some extremely interesting information. The committee feels that if the facts presented in this report will serve as an inspiration to the member companies for greater effort along the lines of accident prevention in the future, its work will have been well accomplished.

Analysis of Accidents of 113 Electric Railways — The committee received a response from 113 electric railway properties situated in thirty-nine states and the Dominion of Canada. These properties represent 27 per cent of the electric railway mileage, 25 per cent of the gross receipts and 31 per cent of the passengers carried. The figures obtained are, in the opinion of the committee, fairly indicative of the trend of accidents in the years 1920, 1921 and 1922.

The committee has ascertained from authorities in other lines of work that the year 1922 was a year of high accident rate in industry as a whole, whereas 1921 was a banner year from the accident standpoint.

The results of our investigation, generally speaking, show that the electric railways as a whole had a high accident rate for the year 1922 as compared with 1921 as far as accident frequency is concerned, but the total cost to the railways shows a great decrease, and, further, the miles operated in 1922 exceeded 1921, which in turn exceeded 1920, and passengers carried in 1922 exceeded 1921. These results should be extremely encouraging to the electric railway industry.

The following totals are obtained from the answers to twelve questions submitted to the 113 electric railways:

	1920	1921	1922
Total number of all accidents	220,950	204,034	214,563
Total number of employees injured	13,523	12,777	13,183
Total cost of claims, injuries, damages, including costs and payments connected with operation, claims and safety departments, welfare and workmen's compensation inclusive of legal, medical and private investigations	$9,009,381.75	$7,759,852.86	$7,472,731.19
Total accidents in which motor vehicles were involved	79,262	79,808	89,582
Total number of car collisions	10,831	7,216	7,367
Total number of fatalities, all causes	582	496	474
Gross income, all operations	$280,503,326.20	$281,774,993.45	$279,433,916.10
Number of car-miles operated	608,810,174	611,111,592	626,944,541
Average total number of employees in service, all departments	89,844	90,161	90,920
Number of passengers carried, free and transfer	4,783,667,505	4,558,735,675	4,594,457,155
Number of cars operated	16,075	16,011	16,265
Miles of track	11,576.11	11,887.17	11,889.41

The above results of accident prevention work are particularly interesting when carefully analyzed. For instance it is assumed that the total number of accidents given above are the total number of accident reports received which may or may not have involved cost to the company or real injury to the person or property. In the last analysis, the item which most clearly demonstrates the results of accident prevention is the third item above, showing the total cost. This total cost in 1922 was $1,350,000 less than in 1920, or approximately 16 per cent. In this connection the following figures are extremely interesting:

	1920	1921	1922
Cost of accidents per 10,000 car-miles operated	$148.00	$127.00	$119.00
Cost of accidents per 100,000 passengers carried	188.00	170.00	163.00
Cost of accidents, percentages of gross earnings	3.2%	2.76%	2.68%
Average cost per accident reported	$42.20	$38.00	$34.80
Number of accidents reported per 10,000 car-miles	3.39	3.32	3.42
Number of accidents reported per 100,000 passengers carried	2.20	2.04	2.14

Fatalities—Various public authorities and accident prevention organizations in the past have laid considerable stress on the results obtained by accident prevention in reducing the number of fatalities. The committee would call to your attention especially the results obtained by these electric railways in reducing the number of fatalities, which in 1920 were 540, to 471 in 1921 and 450 in 1922.

What Causes Accidents — The committee submits causes of car collisions, alighting and boarding accidents, persons struck by car, collisions with other vehicles, submitted by the 113 companies in answer to questions sent out by the committee.

The most hazardous element in the operation of cars was stated by various operators to be streets car-auto vehicular collisions; automobile traffic; street crossing on down grades on paved streets; monetary hazard; step accidents; violation of operating rules and slippery rails; traffic congestion; grade crossings; hills, snow, ice and cold weather; the human element; railroad crossings, fog and cows on track; narrow streets; slick rails.

Co-operation Between Electric Railways and Various Public Bodies, and What Has Been Done Toward Accident Prevention Through Special Methods Introduced by Member Companies — A sub-committee was appointed to obtain this information and it confined its questionnaire to three questions which, with replies received from the company membership of the association, are as follows:

Q. 1. Have you adopted special methods for the reduction of accidents on your property, by means of:

(a) Adoption of a code of safety rules? To this question forty-one members answered No, and forty-one answered Yes.

(b) By the appointment of a safety director? To this question, forty-nine answered No, and thirty-three Yes.

(c) By holding periodical safety meetings? To this, thirty-five answered No, forty-seven Yes.

(d) By the formation of a safety committee? To this, thirty-four answered No, forty-eight Yes.

Q. 2. In what manner, if any, has the chamber or commerce or other civic bodies in your city assisted in an organized way in helping you to carry on effective safety work in your community? Replies received from forty-five member companies indicated that local chambers of commerce or other civic bodies had furnished no special organized assistance while thirty-seven member companies reported that the chambers of commerce in their cities had in various ways assisted in an organized way in furthering the cause of accident prevention.

Q. 3. Is there in your city a local safety council, and if so, to what extent has it co-operated with the various departments in the effort to reduce accidents? Forty-nine member companies reported that in their cities there was no safety council; thirty-three companies reported that there is, and that the same is co-operating fully in accident prevention work.

The report was signed by F. W. Mulford, F. H. Warren, M. W. Bridges, Charles W. Chase, James Harmon, S. B. Irelan, A. W. Koehler, C. E. Morgan, R. M. Reade, Harry Restofski, E. M. Walker, Alba H. Warren, J. V. Sullivan, sponsor; W. H. Boyce, sponsor; H. O. Allison, co-chairman, and H. B. Potter, co-chairman.

President Seely congratulated the joint commission on the work it has done. He suggested that individual companies can take the cue from the report and collect material from their own records, subdividing it according to causes of accident.

The formal discussion was opened by W. G. Fitzpatrick, general claims attorney Detroit United Railway. He said that speaking from the standpoint of the claims man the situation is gratifying. There has been a considerable reduction in accidents on the basis of passengers carried and miles operated. He said that the claims men and the transportations man should and must collaborate and that they should have a sympathetic attitude toward each other. The operator of the cars must, however, become the dominant factor in the situation.

The principal thing is discipline, discipline and still more discipline, said Mr. Fitzpatrick. He felt, however, that compensation laws have a baneful influence, even if they do not directly cause accidents. He said that trainmen should be directly responsible to their superiors and not to some board or commission.

Barron Collier, who was asked to give a written discussion, was unable to be present. His discussion was read by Marcus Dow. According to Mr. Collier, perhaps no industry can do so much for the safety movement as the electric railways, for they have the energy, brains and resources with which to do constructive work. He pointed particularly to the accident record of Greater New York, stating that there were killed in the streets by vehicles last year 965 persons, approximately half of whom were children under sixteen years of age, and more than 6,000 persons were injured.

"I have little faith that the slogans which have been chanted will bring about results," said Mr. Collier, "but I do think that when we go to the root of accidents, the causes for them, as you have done in your report for this year, we have started along the right line to cut down casualties."

Mr. Dow supplemented these remarks by stating that saving the lives of children is a work dear to the heart of Barron Collier. The thing which makes everything in the world worth while is human life. It is bad enough that nearly a thousand lives were sacrificed in the year, but that half of them were children under sixteen years of age was the appalling fact.

President Muir of the Claims Association conducted the informal discussion. Successful safety work is impossible unless there is a spirit of co-operation between the transportation man and the claims man, said Mr. Muir. One can't be successful without the other. They must accept advice from counsel and from each other.

J. H. Handlon, Market Street Railway, San Francisco, said the development of safety devices for cars and safety practices promulgated by public authorities, as well as statistical methods devised for recording and classifying accidents were acting to better the situation. He said that some of the things done decreased certain classes of accidents but increased others. Better methods of selecting platform men were advocated by him. Eccentricities of various men in selecting applicants were scored. Following this care should be taken in the selection of men and they should be watched from the day they are accepted all during the period of training. He believed that it seemed advisable to adopt a follow-up method and give the men a probationary period before they are given full charge on the cars.

Attention was called to certain matters of the report that do not deserve compliment by L. H. Palmer, United Railways & Electric Company, Baltimore. Statistics presented show that half of the companies are not co-operating with the National Safety Council. Many companies have not formed safety committees or appointed safety directors. He thinks that it is an outrage that the companies have not taken advantage of their opportunities in doing work of this sort.

H. O. Allison, co-chairman of the committee, referred to the conclusion of the report on accident prevention, which was ruled out by the committee on publication. Mr. Allison presented this as his own contribution to the discussion. He said that there is no such thing as an unavoidable accident. Poor equipment, bad roadbeds, etc., may culminate in accidents, and therefore should be taken care of in advance. In this way many accidents are prevented which might have occurred otherwise.

James P. Barnes, president Louisville Railway, expressed his dissent from the view of Mr. Fitzpatrick and stated that he thought it equally necessary for a railway to have a brass band as well as to get down to brass tacks. The fact that the employment of men on the Beaver Valley Traction lines is in the hands of the safety engineer was brought out by W. H. Boyce, general manager.

The report of the committee on co-operation with the National Safety Council was presented by L. H. Palmer, general manager United Railways & Electric Company, Baltimore

Co-operation with the National Safety Council

The committee on co-operation with the National Safety Council early in the association year, after correspondence with the headquarters office of the Safety Council, picked out fifty-eight of the most important railway companies that were not members of the council and wrote to them, explaining the benefits of membership and urging them to join. All of the companies were written at least twice, by one or the other of the committee, and in each instance reply was requested. Of this number thirty made no reply, fifteen declined to join, ten joined or had benefits of the council through allied companies and three have the matter under consideration.

The committee was much disappointed in the response to its letters and it appears that the only way in which effective results can be obtained in future is through personal contact of members of the council with those who are not.

The report was signed by W. H. Boyce, Wallace Muir, L. H. Palmer, chairman.

In discussing this paper Mr. Barnes told of the benefits lost to railway companies by their failure to join the National Safety Council.

A paper on "Maintenance of Men" was read by Dr. H. E. Fischer, chief surgeon Chicago Elevated Railways.

Following the presentation of the paper, Dr. Bascom, Illinois Traction System, stated that railways should encourage their employees to consult the company doctor for even minor ailments. He emphasized also the danger of employing men suffering from syphilis.

At the conclusion of the discussion, President Seely of the Transportation & Traffic Association thanked President Muir of the Claims Association for the co-operation of the latter body in joint meeting. Mr. Muir expressed his gratification at the successful character of the meeting. There was no report from the committee on resolutions and the meeting therefore proceeded with the installation of new officers.

The new president, J. K. Punderford, was escorted to the chair by Mr. Smith and accompanied by the other new officers and members of the executive committee. In a graceful speech, the retiring president expressed his wish for Mr. Punderford's success in the ensuing year. Mr. Punderford described briefly the extensive wire pulling that he had done in order to gain his new eminence and promised to perform the duties of the office to the best of his ability.

He presented the badge of past-president to Mr. Seely and stated that no better testimonial of the success of his service as president of the T & T Association could be asked for than the well attended and highly interesting meetings during the convention. In accepting the badge, Mr. Seely expressed his deep gratification. There being no further business the meeting adjourned.

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Biographical Sketches of Newly Elected Officers

Britton I. Budd

A KEENER, abler leader than Britton I. Budd could not have been selected for the American Electric Railway Association. This statement was made in the CONVENTION DAILY issue of the ELECTRIC RAILWAY JOURNAL in announcing Mr. Budd's election. Nothing that could be said about Mr. Budd would state the case better. It does not alter the fact that Mr. Budd would be the last one to subscribe to this view of him. The statement was made not only because of the kind of thinking Mr. Budd has contributed in the counsels of the association, but also because of the splendid record of achievement he has made with the Chicago, North Shore & Milwaukee Railroad and the Chicago Elevated Railroads. In selling transportation and developing good will, Mr. Budd probably stands out as the leading figure in the industry. Furthermore, so many ideas of modern electric railroading are being worked out on his properties that one may learn at every turn some new and progressive method of doing the thing better or at lower cost.

MR. BUDD'S ALL-AROUND EXPERIENCE

A plain statement without frill of the accomplishments made under Mr. Budd's direction confirms the view that there are still many things that can be done to improve the electric railway outlook.

Mr. Budd makes a good president in another respect. He is both interurban and street railway man, and rapid transit, too. There is probably not another man in the industry who is all three. Moreover, he is also president of the Public Service Company of Northern Illinois, one of the Insull electric and gas companies.

Mr. Budd has been associated with the transportation business ever since he left school, at which time he took a situation in the surveying department of a steam railroad in Ohio. In 1893, during the World's Fair at Chicago, he was associated with the Intramural Railway. With the incorporation of the Metropolitan Elevated he saw Chicago's future transportation plans take real form, and when actual operation of that line was commenced in May, 1895, he obtained a position as clerk in the storehouse. With the Metropolitan his rise was rapid, for he soon became storekeeper, then purchasing agent and finally general manager. When Mr. Hetzler, president of the Metropolitan, left in 1910, Mr. Budd was elected president of the company.

In 1911 a consolidation of all the elevated lines in Chicago was brought about, and Mr. Budd was chosen president of the combined system. Besides being president of the Chicago Elevated Lines, he became president of the Chicago, North Shore & Milwaukee Railroad at the time of that line's reorganization in 1916, and more recently assumed the same position with the Chicago and Interurban Traction Company. He was elected president of the Public Service Company of Northern Illinois early this year.

Further evidence of the accomplishments of Mr. Budd is afforded by the award of the Coffin medal to the Chicago, North Shore & Milwaukee Railroad, headed by him. The work of that road is reviewed in the report of the Coffin committee, presented elsewhere in this issue.

All in all Mr. Budd's election bids fair to insure another year of great accomplishment for the association.

Harley A. Johnson

H. A. JOHNSON, who was elected president of the Engineering Association, is an alumnus of Purdue University, class of 1905. By progressive steps, taken during the past eighteen years, he has risen to the position of assistant to the general manager Chicago Elevated Railroads. In his present position he assists the general manager in carrying out the details of operation and maintenance of the property.

While in college Mr. Johnson was president of the mechanical engineering society. He was active in all student matters, being elected to Tau Beta Pi after one year in college. He graduated with the highest mark in the mechanical engineering class and was the representative of the mechanical engineers on the commencement-day program.

During his days at Purdue, and immediately following, he was a special apprentice in the mechanical department of the C., B. & Q. Railroad intending to enter the steam railroad field as a life work. In this position he worked in the drafting room, as a locomotive fireman, in the testing laboratory, in the locomotive erecting shop and on locomotive road tests.

In 1905 he entered the service of the Metropolitan Elevated in Chicago as helper in the shops, and worked his way up through different departments, including those of maintenance of way and transportation. In 1907 he was made engineer of car equipment, and three years later master mechanic, having the duties of superintendent of equipment.

When in 1911 the elevated railways consolidated, Mr. Johnson was made master mechanic of all of them, his title being shortly changed to superintendent of shops and equipment. In this position he handled the design and followed the construction of the new steel cars purchased in 1914 and 1915. This was his most responsible job up to that time. In 1916 his duties were extended to include similar ones for the Chicago, North Shore & Milwaukee Railroad.

In 1918 Mr. Johnson was made organization engineer for the four elevated railroads, being promoted three years later to his present position. He has charge of the educational work on the elevated lines and is chairman of the expense and budget committee. This committee approves all items of budgets and special authorizations for work, both construction and operation. He helped to organize the local company section of the American Association and was president for the first two years. He was on the original committee that inaugurated safety work on the "L" system. He was detailed by Mr. Budd to investigate the subject of motor buses for the North Shore Railroad.

Mr. Johnson has been long active in committee work of the Engineering Association. He also interests himself in Chicago technical and other organizations. He is a member of the Western Railroad Club, the Western Society of Engineers, the American Institute of Electrical Engineers and the Illinois Electric Railways Association.

J. K. Punderford

THE newly elected president of the Transportation & Traffic Association, J. K. Punderford of New Haven, Conn., is general manager of the Connecticut Company, which operates 802 miles of track and owns nearly 1,500 motor cars and a number of buses. It operates a large majority of the electric railways in Connecticut and serves all of the large cities in the state. Mr. Punderford has been connected with this property or its predecessor in New Haven for thirty-one years.

The new president of the Transportation & Traffic Association is a native of New Haven and naturally went to Yale University. He took the combined electrical and mechanical engineering course then given and was graduated in 1892. His first job was an electric railway one, assisting in the erection of the power station of the West Haven Street Railway. In the autumn of 1892 he went to Schenectady to take the students' course in electrical engineering then being given in the Edison works, but returned to New Haven and became connected with the Fair Haven & Westville Street Railway, then the largest electric railway property in the city.

At first he was engaged in the track department, but later entered the operating department, and when the company acquired the other electric railways in New Haven and vicinity he was made general manager of the combined system. Later, when the New York, New Haven & Hartford Railroad purchased the property and the other electric railways in the state Mr. Punderford was retained as general manager of all of the combined properties which now comprise the Connecticut Company.

Although most of Mr. Punderford's active business career has been in the transportation side, he has never lost his interest in engineering, especially in trackwork, and has given quite a little of his time to this department.

Mr. Punderford has always taken an interest in association affairs and served last year as first vice-president of the Transportation & Traffic Association. He is also an ex-president of the Union League Club of New Haven and an ex-president of the Connecticut Society of Civil Engineers.

Information Bureaus Meet

AT THE invitation of W. H. Sawyer, president East St. Louis & Suburban Railway, representatives and officers of state and sectional associations and directors of the public utility information bureaus, gathered for a luncheon at the Marlborough-Blenheim Hotel on Tuesday. There has been such a rapid expansion in the number and work of these information bureaus it was believed much good could be accomplished by such an assemblage. Several officers and past officers of the association and representatives of some of the sectional organizations were present.

Those in attendance were as follows:

Representatives of public service information bureaus—J. S. S. Richardson, Philadelphia; H. M. Lytle, Chicago; Joseph B. Groce, Boston; Benjamin E. Ling, Cleveland; A. B. McCrum, Charleston, W. Va.; Frantz Herwig, Milwaukee; John N. Cadby, Madison, Wis.; J. W. Holcomb, Cleveland; and Frank Bellville, Louisville, Ky.

Sectional association representatives—W. V. Hill, manager California Electric Railway Association; L. E. Earlywine, secretary Central Electric Railway Association, and E. N. Willis, secretary Southwestern Public Service Association.

Among the officers of the association and delegates from member companies were: President C. D. Emmons; Vice-Presidents B. I. Budd and J. N. Shannahan; Past-Presidents P. H. Gadsden, J. J. Stanley and L. S. Storrs; Secretary J. J. Welsh; Treasurer Barron Collier; and E. C. Faber, J. H. Alexander, J. P. Barnes, C. D. Cass, W. P. Strandborg, Labert St. Clair and J. W. Colton.

The most extended address was by Mr. Lytle of Chicago, a pioneer in the movement. Others who spoke were Messrs. Budd, Collier, McCrum, Richardson, Groce, St. Clair, Strandborg, Willis, Hill, Ling and Cadby.

New Officers of the Accountants' Association

At the meeting of the American Electric Railway Accountants' Association on Oct. 11 the following were elected officers of the association:

President, E. M. White, treasurer Binghamton Railway, Binghamton, N. Y.

First vice-president, W. L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa.

Second vice-president, J. J. Duck, general auditor Chicago Surface Lines, Chicago, Ill.

Third vice-president, Walter Shroyer, secretary Union Traction Company of Indiana, Anderson, Ind.

Executive committee: L. E. Lippett, auditor Auburn & Syracuse Railway, Auburn, N. Y.; T. B. MacRae, general auditor Metropolitan West Side Elevated Railway, Chicago, Ill.; O. H. Bernd, secretary and auditor Des Moines City Railway, Des Moines, Iowa; E. H. Reed, auditor Brooklyn City Railroad, Brooklyn, N. Y.

Engineering Association Proceedings

The Advance of National Standardization Was One of the Outstanding Features—Methods of Handling Materials and Supplies, and of Accounting, Are Given Consideration—Arrangements Are Completed for Revision of the Engineering Manual

THE first session of the Engineering Association was held Monday afternoon, Oct. 8, with President L. C. Datz presiding. President Datz's address, which outlines the achievements of the association, follows:

President's Address

In his presidential address to the Engineering Association, L. C. Datz reviewed the accomplishments of the various sub-committees and the work of the association during the year and made several suggestions as to its future course. He spoke of the work of the committee on methods of voting on standards, as well as that of the committee on revision of the Engineering Manual. He stressed the amount of work that has been done on this revision and mentioned the fact that the executive committee of the American Association had approved the request to print the new manual.

Mr. Datz described the report of the committee on heavy electric traction and spoke of a question as to the proper scope of its activities. Mention was made also of the report of the special committee on wheel and rail contours, the equipment committee and that on buildings and structures. Praise was given to the committee on wood preservation for its work during the year and also to that on air reservoir specifications. The report of the committee on purchases and stores was praised by Mr. Datz, as was that of the committee on way matters.

Electrical problems were covered in the reports of the special committee on automatic substations, that on power distribution and on power generation. Increasing activity of the Engineering Assocation was mentioned in connection with the drafting of a policy to establish a definite and simple procedure in matters relating to the American engineering standards committee. Continuing, Mr. Datz said:

A great deal of serious thought has been given in the past few years to various phases of the Engineering Association, its activities and methods and the effect its results have in the electric railway industry.

One of the most important questions is that pertaining to standards. Is the present method of appointing the standards committee and the way it functions conductive to obtaining effective results? To this I would say "Yes" conditionally, because a committee of fifteen men, nine of whom represent railway companies and six represent manufacturers, can be selected that will guard this phase of the work efficiently, if the committee be carefully chosen with regard to necessary experience to pass upon such matters intelligently.

L. C. Datz
Retiring President

In connection with our standards and the use of same by our companies, the revision of our Manual and the adoption of some of our standards as American standards by the A. E. S. C. will aid materially in accomplishing results. I am pleased to state that there seems to be a noted improvement in the use of association standard for 7-in. grooved girder rail. I know personally it has been laid in New Orleans, Memphis, Knoxville and Little Rock in goodly quantities in the last two years. However, there is room for a great deal of improvement, and with the constant endeavor of our association to make our standards represent the last word in the art, we should do everything necessary to bring the use of same about, in order to offset the criticism for non-use of association standards we have been hearing so much.

Then there has been a great deal said about too many associations working independently on allied subjects. We should have ever before us the elimination of wasted effort and expense incurred in duplication of work by various technical associations on subjects in which they are interested individually. A great deal of this duplication can be eliminated by joint effort of interested associations, and I am pleased to say that it is becoming the practice more and more for the various associations to co-operate along these lines. The American Engineering Standards Committee serves as a happy and efficient medium in a great many cases.

H. A. Johnson
President-Elect

INDIVIDUAL MEMBERSHIP

I would like to see this association take the proper steps to further the inclusion of a course of public utility engineering in curriculums of colleges of recognized standing.

I want to call the incoming administration's attention to an opportunity to strengthen the Engineering Association by increasing the number of individual members. I am thoroughly sold on this idea, and I have been an individual member of the Engineering Association since my days in the drafting room some years ago. I speak from experience when I say that there are advantages incidental thereto that no man in justice to himself and the company he serves can afford to forego. These benefits follow active participation in the work of the association, in proportion to the well-directed thought and time put into it. Personal contact with other men interested in the same problems broadens a man's viewpoint, which cannot help but reflect favorably in the kind of effort he puts forth in his company's interest.

Although the Engineering Association has by far the largest number of indiviual members of any of the affiliated associations, there are still quite a number of men who should be individual members of this association, and we can render them a real service by bringing to their attention the benefits to be had by joining this association and taking an active part in its work. The dues are $5 per year, extremely nominal, and are kept purposely so in order to make it possible for every man connected with the engineering end of the electrical railway industry, whether he be the chief engineer, mechanical, electrical or civil engineer, signal engineer, superintendent of equipment, of power, of railway or of overhead construction, master mechanic, inspector, foreman, draftsman, as well as purchasing agent, storekeeper, or assistant to any of these officers.

I would strongly recommend that a

special committee to increase individual membership in the Engineering Association, to work in harmony with the American committee on membership, be appointed.

In conclusion, Mr. Datz mentioned the pleasure he had had in serving as the head of the Engineering Association and thanked the members for the assistance they had given him.

G. C. Hecker read the secretary's report prepared by J. W. Welsh, setting forth the various accomplishments of the association during the past year.

Secretary-Treasurer's Report

There were ten standing and six special committees during the year, the total personnel being 169, exclusive of the executive committee. Thirty-nine committee meetings were held, with a total attendance of 294 members.

Co-operative work on the part of the committees with other associations has resulted in the completion of several important specifications, including those for track construction, prepared in co-operation with the American Society for Municipal Improvements, and the specifications for the manufacture of open-hearth steel girder rails of plain, grooved and guard types.

The committee on power distribution has co-operated with the American Society for Testing Materials in harmonizing the specifications for round and grooved high-conductivity trolley wire. The committee on way matters is co-operating with the American Railway Engineering Association in studying the design of substitute ties and in formulating specifications for crossings of steam railroads and electric railway tracks.

The recommendations of the 1922 committee on way matters regarding a research program in connection with the work of the committee on welded rail joints resulted in an appropriation of $10,000 by the American Association and contributions amounting to $13,477 by a number of member companies. This will be used for the construction and operation of the necessary service testing machines and for other expense involved in developing the several types of welded rail joints now on the market.

There is now under way the formation of an American Committee on Inductive Co-ordination, which will be representative of all interests involved and which the association is developing in connection with the National Electric Light Association and the Bell Telephone System.

Relations with the American Engineering Standards Committee are becoming increasingly important each year. Six of the Manual sections have been approved as "American standard" and one as "tentative American standard." Other proposals of the association will be take up through sectional committees.

The committee on revision of the Engineering Manual has been active and it has been definitely decided to publish the Manual hereafter in the form of a bound volume to be reissued at intervals of from three to five years.

As to membership, the total number of individual members, Aug. 31, 1922, was 528. Since then twenty-five applicants have been admitted; twenty-seven members have resigned, and forty-seven delinquents have been dropped, making the net membership Sept. 15, 1923, 479.

The annual report of the executive committee was approved by title only, inasmuch as the report will be printed in full in the proceedings of the association.

COMMITTEE APPOINTMENTS

H. H. Norris, C. R. Harte and R. C. Cram were appointed as the convention committee on resolutions.

In the absence of C. S. Kimball, chairman of the committee on methods of voting on standards, G. C. Hecker read the committee's report. This was simply a progress report which recommended that the subject be continued. The report was approved.

Engineering Manual

R. C. Cram presented a report of the committee on revision of the Engineering Manual, explaining why it was necessary to have a committee investigating this subject. The difficulties encountered in endeavoring to keep the old loose-leaf Manual together and the expense of keeping it up to date were factors which finally led to the adoption of a bound volume. An appropriation of $5,500 recommended by the committee for the purpose of revising the Manual has been approved by the executive committee of the American Association. H. H. Adams, in his motion to approve the committee's report, stated that he believed it was time to revise the Manual because of the unwieldy form of the old volume. The recommendation that the committee be continued was approved.

Heavy Electric Traction

The bibliography of heavy electric traction and electrification data has been checked and revised by Prof. R. B. Warner of Yale University. It has been suggested that a complete rearrangement of the list be made, classifying together all articles appearing in a given periodical during any one calendar year, and from this compiling the subject index. The work would thus comprise: (1) A group of articles in any one periodical; (2) a chronological grouping, and (3) a subject index. Subsequent additions may readily be made as desired without material addition to the cost of printing.

The committee recommends that a complete bibliography, rearranged as outlined, be compiled and printed next year and automatically revised from year to year.

With regard to branch line electrification the committee states that with few exceptions branch line electrifications were made several years ago and there has been no material development during recent years. The committee, therefore, has not made a comprehensive investigation of the situation, feeling that such information would not be of material value, particularly in view of the recent tendency to substitute self-propelled cars for steam service on branch lines.

The self-propelled car is undoubtedly of interest to those responsible for electric railroads as well as to the operators of steam road branch lines.

The committee on equipment of the A. E. R. E. A. in 1912 compiled an extremely comprehensive report covering the development of self-propelled cars. The cars developed at that time were of various types, such as gasoline, steam, compressed air, storage battery, etc. Subsequent to 1912 an interruption seems to have occurred in the development of self-propelled cars for branch line operation.

Recently, renewed interest in the self-propelled car has been manifested. A number of roads in this country and abroad have adopted, and are operating successfully, a type of gasoline-driven car considerably smaller than those which were most common in 1912.

During the past few years the development of heavy electric traction has been of necessity somewhat slow on account of lack of funds available for expansion. Many railroads, however, have actively considered the question of electrification as a solution for their individual problems, and several engineering investigations have been completed and plans made for electrification. These are described in some detail in the report.

The report was signed by A. H. Armstrong, R. Beeuwkes, J. M. Bosenbury, H. W. Cope, J. H. Davis, J. V. B. Duer, E. C. Johnson, Norman Litchfield, A. S. Richey, C. H. Quereau, L. S. Wells, H. A. Johnson, John C. Davidson, vice-chairman, and Sidney Withington, chairman.

Sidney Withington, New Haven Railroad, added to the report the following data regarding Baltimore & Ohio Railroad locomotives: The company has bought two new electric locomotives, weighing 120 tons each, for use in passenger and freight service. The gear ratio is 19:83, and at 14½ m.p.h. the tractive effort is 19,400 lb. The maximum tractive effort is 72,000 lb., and the maximum safe speed is 35 m.p.h. The railroad is also rebuilding four old locomotives to bring their weight to 120 tons each. Cast-iron ballast is being installed in the cabs. The gear ratio is also being changed.

Mr. Withington emphasized the importance of the bibliography, pointing out that the new plan outlined in the report calls for continuity. The old bibliography contained many errors which have been corrected. On the subject of the self-propelled car he said that this is making rapid progress, and many railroads are feeling their way in solving traffic problems by using this type of car, sometimes temporarily. No standardization is possible at this time. The data given in the committee's table are not complete, but a complete list of railroads to which questionnaires were sent will be appended.

H. A. Johnson, Chicago Elevated Railways, said that the question had been raised as to whether the committee on heavy electric traction has been functioning in accord with the wishes of the association. The original purpose of the committee was to keep the members informed regarding the progress of electric traction on steam railroads. It has been working principally along this line. A special committee was appointed by the executive committee to study this matter, and on behalf of this committee he recommended that the scope of the work be broadened to include heavy traction on urban and interurban railways.

C. R. Harte, the Connecticut Company, said that the association is vitally interested in the self-propelled car of the type that the steam railroads are using. Electric railways must concern themselves in the development of auxiliary vehicles. Of these the bus is difficult to maintain, whereas the self-propelled car is rugged.

The report of the committee was then accepted.

Wheel and Rail Contours

H. H. Adams, Chicago Surface Lines, abstracted the report of the special committee on wheel and rail contours. He stated that the last revision of wheel contours was made in 1907. At five conventions since then revisions have been proposed but not acted upon. In 1922, however, the association deemed the matter important enough to appoint this special committee. The result has been that a set of contours has been agreed upon. These are the same for chilled and steel wheels below the tread line. An abstract of the report follows:

ABSTRACT OF REPORT

The committee submitted four contours of wheel flanges, each in combination with two widths of wheel treads and recommended that these be adopted as standard for both steel and chilled-iron wheels. An additional contour which is the same as that which is standard for the American Railway Association was also submitted for use where larger wheel flange and wheel tread are required.

The flange contours are alike for both steel wheels and chilled cast-iron wheels

STANDARD DIMENSIONS FOR A.E.R.E.A. PROPOSED STEEL WHEEL DESIGNS

TABLE NO 1.—FLANGE THICKNESS 1 IN., TREAD AND FLANGE CONTOUR D 2½

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	21	⅝	1	½	3½	2	7	4½ or 5	3⅛	4⅛
2	22	⅝	1	½	3½	2	7½	4½ or 5	3⅛	4⅛
3	24	⅝	1	½	3½	2	7½	4½ or 5	3⅛	4⅛
4	26	⅝	1	½	3½	2	8½	4½ or 5	3⅛	4⅛
5	28	⅝	1	½	3½	2	8½	4½ or 5	3⅛	4⅛
6	31	⅝	1	½	3½	2	8½	4½ or 5	3⅛	4⅛
7	33	⅝	1	½	3½	2½	8½	4½ or 5	3⅛	4⅛
8	34	⅝	1	½	3½	2½	8½	4½ or 5	3⅛	4⅛

Note: Minimum rough bore 3¾ in.

TABLE NO. 2.—FLANGE THICKNESS 1 IN., TREAD AND FLANGE CONTOUR C 2½

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	21	¾	1	½	3½	2	7	4½ or 5	3⅛	4⅛
2	22	¾	1	½	3½	2	7½	4½ or 5	3⅛	4⅛
3	24	¾	1	½	3½	2	7½	4½ or 5	3⅛	4⅛
4	26	¾	1	½	3½	2	8½	4½ or 5	3⅛	4⅛
5	28	¾	1	½	3½	2	8½	4½ or 5	3⅛	4⅛
6	31	¾	1	½	3½	2	8½	4½ or 5	3⅛	4⅛
7	33	¾	1	½	3½	2½	8½	4½ or 5	3⅛	4⅛
8	34	¾	1	½	3½	2½	8½	4½ or 5	3⅛	4⅛

Note: Minimum rough bore 3¾ in.

TABLE NO. 3.—FLANGE THICKNESS 1 IN., TREAD AND FLANGE CONTOUR D 3

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	24	⅝	1	½	4	2	7½	4½ or 5	3⅛	4⅛
2	26	⅝	1	½	4	2	8½	4½ or 5	3⅛	4⅛
3	28	⅝	1	½	4	2	8½	4½ or 5	3⅛	4⅛
4	31	⅝	1	½	4	2	8½	4½ or 5	3⅛	4⅛
5	33	⅝	1	½	4	2½	8½	4½ or 5	3⅛	4⅛
6	34	⅝	1	½	4	2½	8½	4½ or 5	3⅛	4⅛

Note: Minimum rough bore 3¾ in.

TABLE NO. 4.—FLANGE THICKNESS 1 IN., TREAD AND FLANGE CONTOUR C 3

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	24	¾	1	½	4	2	7½	4½ or 5	3⅛	4⅛
2	26	¾	1	½	4	2	8½	4½ or 5	3⅛	4⅛
3	28	¾	1	½	4	2	8½	4½ or 5	3⅛	4⅛
4	31	¾	1	½	4	2	8½	4½ or 5	3⅛	4⅛
5	33	¾	1	½	4	2½	8½	4½ or 5	3⅛	4⅛
6	34	¾	1	½	4	2½	8½	4½ or 5	3⅛	4⅛

Note: Minimum rough bore 3¾ in.

TABLE NO. 5.—FLANGE THICKNESS 1⅛ IN., TREAD AND FLANGE CONTOUR B 2½

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	26	¾	1⅛	½	3⅝	2	8½	5	2 11/16 or 1 11/16	
2	28	¾	1⅛	½	3⅝	2½	8½	5		
3	31	¾	1⅛	½	3⅝	2½	8½	6		
4	33	¾	1⅛	½	3⅝	2½	9½	6		
5	34	¾	1⅛	½	3⅝	2½	9½	6		
6	36	¾	1⅛	½	3⅝	2½	9½	6		

Note: Minimum rough bore 3¾ in.

TABLE NO 6.—FLANGE THICKNESS 1⅛ IN., TREAD AND FLANGE CONTOUR B 3

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	26	¾	1⅛	½	4⅛	2	8½	5	2 11/16 or 1 11/16	
2	28	¾	1⅛	½	4⅛	2½	8½	5		
3	31	¾	1⅛	½	4⅛	2½	8½	6		
4	33	¾	1⅛	½	4⅛	2½	9½	6		
5	34	¾	1⅛	½	4⅛	2½	9½	6		
6	36	¾	1⅛	½	4⅛	2½	9½	6		

Note: Minimum bore 3¾ in.

TABLE NO. 7.—FLANGE THICKNESS 1 3/16 IN., TREAD AND FLANOE CONTOUR A 3

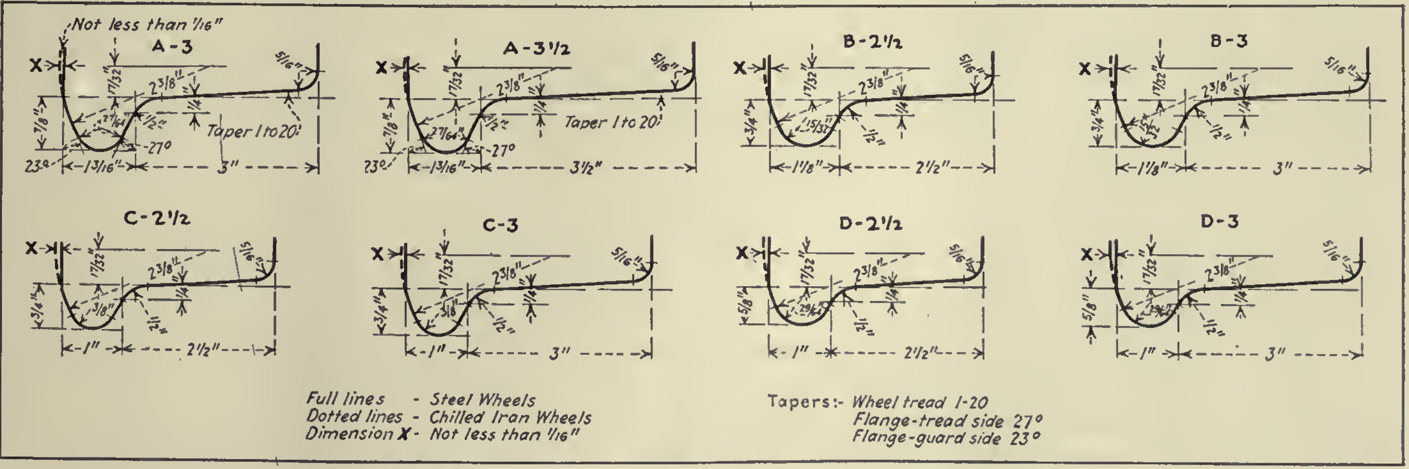
Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	33	⅞	1 3/16	½	4 3/16	2½	9½	6	2 11/16 or 1 11/16	
2	34	⅞	1 3/16	½	4 3/16	2½	9½	6		
3	36	⅞	1 3/16	½	4 3/16	2½	9½	6		

Note: Minimum rough bore 3¾ in.

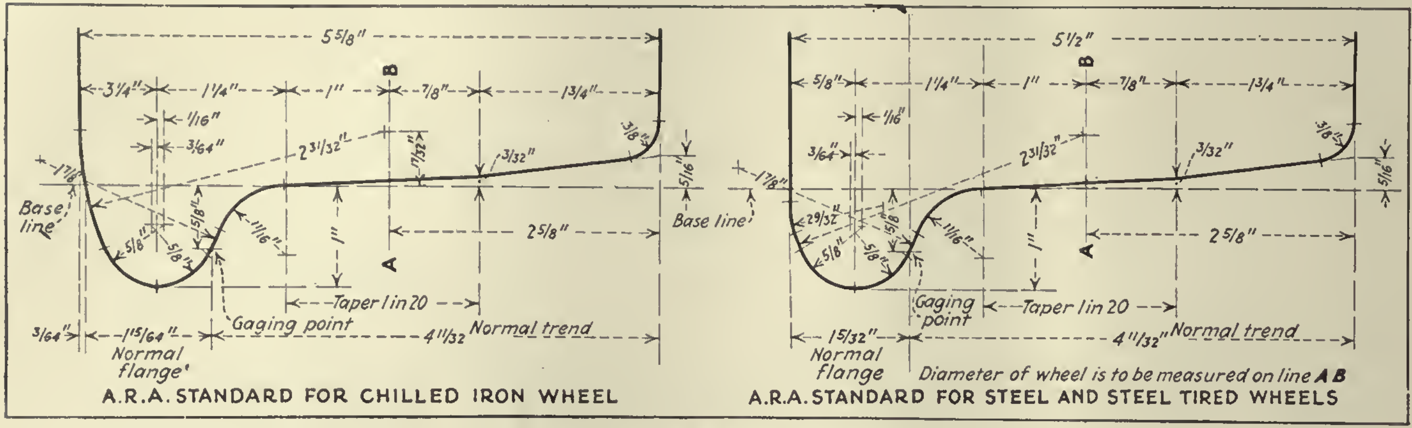
TABLE NO. 8.—FLANGE THICKNESS 1 3/16 IN., TREAD AND FLANGE CONTOUR A 3½

Number of Wheels	Diameter D Inches	Flange Height a Inches	Flange Thickness b Inches	Throat Radius c Inches	Rim Width e Inches	Rim Thickness d Inches	Hub Diameter t Inches	Hub Length n Inches	Hub Projection Track Gage 4 ft. 8½ in.	Hub Projection Track Gage 5 ft. 2½ in.
1	34	⅞	1 3/16	½	4 11/16	2½	9½	6	2 11/16 or 1 11/16	
2	36	⅞	1 3/16	½	4 11/16	2½	9½	6		

Note: Minimum rough bore 3¾ in.



Tread and Flange Contours Proposed for Steel and Chilled-Iron Wheels



A.R.A. STANDARD FOR CHILLED IRON WHEEL

A.R.A. STANDARD FOR STEEL AND STEEL TIRED WHEELS

A.R.A. Standard Wheel Contours

below the level of the tread. On steel wheels the back of the wheels follows a straight vertical line above the tread level. On chilled-iron wheels the curve of the flange contour is continued above the tread level to produce a gradual thickening of the metal.

The recommendations of the committee were that the wheel contours submitted be adopted as standard and that wheel contours shown in the Engineering Manual under Et. 4a be superseded and withdrawn. Also that the table of dimensions for steel wheels submitted by the committee be adopted as standard to supersede the present standard dimensions as shown in the Engineering Manual Section Et. 7b, this table being a revision of the dimensions to suit the new proposed wheel contours.

In addition to the Manual sections referred to, the proposed standards effect section Et. 18a, wheel mounting and check gages adopted in 1919; Em 3a, limit of wear for association flange contours adopted in 1916; Ws 2a, rules for determining gage of track on curves adopted in 1911. The committee recommended that these sections be referred to committees of the association for revision next year.

The report was signed by C. A. Alden, V. Angerer, George L. Fowler, J. M. Larned, J. H. Lucas, A. D. McWhorter, A. J. Miller, J. F. Miller, J. M. Yount, J. H. Hanna, vice-chairman, and H. H. Adams, chairman. H. Fort Flowers, a member of the committee, did not concur in the report.

The committee's recommendations were then approved, but the report was referred to the next equipment committee for revision of the tables which accompany the contours, with instructions that they be expanded to permit any standard contour to be obtained with any standard wheel diameter.

Discussion centered on the necessity for the providing extra metal in chilled wheels above the tread line. Experts in wheel manufacture explained that the extra metal is needed in chilled wheels to strengthen the flange This is not required in the steel wheels and, moreover, they cannot be rolled to provide it. The American Railway Association endeavored to have this extra metal rolled but the attempt had to be abandoned.

Objection to the extra metal was raised on account of the possible wear on girder guard rails, but it was pointed out that in practice no wear is caused by the wheels above the tread line. In fact, the contour of the guard rail provides clearance for this extra metal. The curvature on T-rails serves the same purpose.

The special committee was then discharged with thanks for its excellent work.

W. W. Wysor, United Railways & Electric Company, raised a question as to the desirability of using narrow treads, and Mr. Adams explained that the committee recommends the use of wide treads wherever possible.

H. Fort Flowers, Differential Car Company, explained his reasons for putting in a minority report on this subject. He said that undoubtedly the committee had recommended wheel contours that were in accord with the wishes of the way committee of two years ago. Since then, however, new rail contours have been adopted in several cities, emphasizing the advantages of a compound fillet. New wheels and rails should fit.

It has been claimed that a wheel contour will conform to a rail contour after 600 miles of wear and that, therefore, the compound fillet is unnecessary. This conclusion leaves out of account the fact that in this rolling process metal is taken from the flange, and the life of the wheel may be decreased by as much as 3,000 miles. Mr. Flowers favored the continuation of the special committee so that this matter could have further consideration.

R. C. Cram, Brooklyn-Manhattan Transit Corporation, on behalf of the committee on revision of the Manual, asked that the equipment committee be instructed to revise the contour tables promptly, and it was understood that this will be done before the Manual is reissued.

Mr. Cram brought up the question of the advisability of adopting a new standard grooved girder guard rail for curves. He stated that now about 75 per cent of the rail production is of association standard rails. The matter was also discussed by C. H. Clark, H. Fort Flowers and C. A. Alden.

Tuesday's Sessions A.E.R.E.A.

The second session of the Engineering Association convened promptly at the appointed time Tuesday afternoon with president L. C. Datz in the chair. The report of the equipment committee for subjects Nos. 1, 2, 4 and 5 was presented by the chairman, F. H. Miller. The report on subject No. 3, which included a review of existing standards with recommended changes, was presented by C. W. Squier.

Equipment

This year's equipment committee reported on five subjects. The first of these was a study of gearing. Information in regard to helical gears was obtained from twenty-six replies to a questionnaire. This is the third year that information has been obtained in this manner, and since three years is just about the average life of a modern heat-treated pinion, information in regard to actual life could be arrived at only by estimation.

There is a marked difference of opinion, as reported, on the relative flange wear when spur or helical gearing is used; companies representing 47.5 per cent of the sets reported say that the flange wear is not greater with helical gearing than with spur gearing; 21.9 per cent say the wear is about the same, and 12.3 per cent say the difference is not noticeable.

With respect to the helical gearing running quieter than spur, companies representing 81.9 per cent of the sets reported say "yes" when new; 64.2 per cent of the sets reported say "yes" when half worn out, and 37.4 per cent of the sets reported have insufficient data to answer as to this when the gears are completely worn out.

Regarding the long and short addendum tooth, as applied to both the helical and the spur type of gearing, the leading manufacturers are agreed that it is an improved design. It is, of course, highly desirable that a standard form of tooth be adopted by all gear manufacturers. It was brought out that for long and short addendum gearing a limit-of-wear gage for gears and pinions would be desirable and would be a great aid to shopmen in determining just when to remove a gear or pinion without sacrifice of mileage or danger of the gearing failing while in service.

A careful study of web holes in gear blanks was made and the report included a table of the size and location of web holes in railway motor gear blanks as at present furnished by manufacturers. This should enable users to familiarize themselves with the present size and location of web holes, and the equipment committee recommended that this subject be studied by next year's committee with an idea of reducing the number of these.

The second subject reported on was various devices for trolley contact and their effect upon trolley wire. Information in regard to this subject was also obtained by means of a questionnaire, from which the following conclusions have been reached:

1. That trolley wheels of manufacturers' standard compositions give mileage equal to those using special composition.
2. That solid wheels are preferable to built-up type.
3. That standard "U" or "V" groove is most satisfactory under normal operating conditions.
4. That wheels lubricated with grease in hollow pin give greater mileage than wheels lubricated otherwise.

The number of companies using or testing the sliding contact indicates a growing demand for a better device than the trolley wheel, particularly for high-speed service.

Subject No. 3 was a review of existing standards and recommendations for changes. Specification Eb 4b, recommended specification for air brake hose, was changed in a few minor details to bring this into conformity with a similar specification of the American Railway Association. Specification Ec 1c, standard dimensions for height of bumpers and platforms, was withdrawn and the specification recommended by the 1922 committee of equipment was substituted. Through a misunderstanding in the last printing, both the old and the recommendations of the 1922 committee were included.

Et 3c, design of axles for electric railway motors, was corrected in line with previous recommendations. An enlarged diameter for the standard E-2 axle, which was previously omitted, was added. E-12 axle was renumbered as E-1a, so that the order of drawings would be in the same sequence as that contained in the table of dimensions. The diameter for the gear hub and motor bearing flange of E-7 axle was changed from 8 in. to 9 in. and that for the E-9 axle from 9½ in. to 10 in., in order to bring these into conformity with the stepping used for other axles. A paragraph stating tolerances, which was recommended by the 1922 committee, was added to each drawing.

Standard specification Et 9b for quenched and tempered carbon steel axles, shafts and similar forgings, and Et 11b, specification for annealed carbon steel axles, shafts and similar forgings, were changed in a few instances in order to bring these into conformity with similar specifications of the American Society for Testing Materials. Specifications for gears and pinions numbered Et 14b, Et 15b, Et 16b and Et 17b had the diameter and spacing for web holes withdrawn until definite recommendations regarding these could be recommended.

A careful review of the existing miscellaneous methods and practices referring to equipment was made, and the committee recommended that these be eliminated from the manual proper and that this subject be referred to succeeding committees for revision and republication in a separate pamphlet.

SPRING SUPPORTS FOR RAILWAY MOTORS STUDIED

Subject No. 4 included a study of spring supports for railway motors. Improved forms of spring supports were suggested and information given in regard to pressure and suspension which should be of particular use in design of future suspensions.

It was determined that it was desirable to have different types of spring supports for different sizes and weights of motors, but that it might be possible to eliminate some of the supporting methods now used, the motors were grouped into three classes, as follows:

(a) Motors up to 35 hp. for use on single-truck and lightweight double-truck cars, suspended by means of single spring suspension on the motor nose.

(b) Motors above 35 hp. and up to 75 hp. for double-truck service, equipped with suspension bar and double spring supports.

(c) Motors 75 hp. and over, for interurban and rapid transit service, having a rigid nose suspension.

Three types of improved motor suspension are submitted as examples of what might be done to improve conditions. The important matter of allowing for lateral material has been provided for, without distorting the springs. These suggested designs or modifications of them will no doubt cost slightly more than the present types of motor suspension, but should pay for themselves in reduced maintenance cost in a short while.

The committee thought that more accurate data as to the amount of permissible motion desirable and the downward and upward pressures obtained in service with different sized motors, due both to ordinary service and shocks, was desirable, and it recommended that this subject be continued by next year's committee.

Subject No. 5 included a study of standard dust guard designs as used by the American Railway Association. Designs were submitted for dust guards for five different sizes of journals, which the committee recommended for adoption as A.E.R.E.A. standards.

The report was signed by Walter S. Adams, Lewis J. Davis, Charles Gordon, J. L. Gould, Stuart Hazelwood, J. M. Hipple, A. J. Miller, M. O'Brien, E. D. Priest, E. S. Sawtelle, C. W. Squier, W. G. Stuck, A. Taurman, Daniel Durie, sponsor, Pierre V. C. See, vice-chairman, and F. H. Miller, chairman.

Recommendations of the standards committee were presented after each subject was ready for consideration. There was considerable discussion in regard to referring certain subjects as recommended by the standards committee back to the equipment committee in view of the urgent necessity of printing these in the Manual.

J. M. Hipple, Westinghouse Electric & Manufacturing Company, said that the allowance for bore of gears as recommended by the equipment committee would be a great convenience to both gear and truck manufacturers, and he felt that these should be approved. H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago, in explaining the reason for the action taken by the standards committee, said that while undoubtedly the recommendations of the equipment committee would prove a great convenience to both truck and gear manufacturers, the standards committee felt that if tolerances for the bore of gears were approved, it would prevent the operating companies from specifying the pressure at which gears should be pressed on axles, which is desirable.

The report of the equipment committee was approved with the exception of parts recommended by the standards committee as being referred back for revision.

Co-operation Through Organization

A. D. McWhorter, Memphis Street Railway, then read a paper on "Organization and Accomplishments of Association of Electric Railway Men in Mechanical Departments of Southern Properties." It is abstracted elsewhere. The discussion brought out the fact that such co-operative work as was described has a stimulating effect on the men in the mechanical departments and is highly commendable. There was no adverse criticism of the plan.

President Emmons then came into the meeting to say a good word for the manufacturers and their exhibits. He urged the engineers to make the most of the opportunity afforded by the presence of so much equipment on the pier. Referring to the bus exhibits, he warned the engineers, in a humorous way, that they may have to revise their methods. They may have garages as well as shops to look after. What they must give is the transportation that the people want. The change to the bus is no more radical than occurred when horse railways were electrified.

N. E. Drexler, chairman of the committee on buildings and structures, presented the committee's report in abstract, taking up the four sections of the report in turn. Before taking action on the recommendations H. A. Johnson presented the recommendations of the standards committee on those of the buildings and structures committee. The recommendation of the committee that a portion of the report entitled prepayment and postpayment inclosures be published in the Manual as miscellaneous methods and practices was disapproved. However, the standards committee approved the recommendation that the drawings of culverts, trestles and bridges, together with fundamental data, be adopted as miscellaneous methods and practices and also approved the recommendation that various sections of the Manual referred to in the report of the committee on buildings and structures be revised to conform to standards of various national associations. The recommendations of the standards committee relative to those of the buildings and structures committee were approved. Favorable action was likewise taken on the original report of the committee on buildings and structures.

Buildings and Structures

The report of the committee is divided into four general subjects: (1) Review and bring up to date the study of electric railway terminals for both city and interurban service under the following classifications: Passenger, freight, combination, and prepayment and postpayment inclosures; (2) review and bring up to date the study of waiting stations (other than terminals) of moderate cost for interurban lines; (3) continue the study and report on the design of small bridges, culverts and trestles, with a view to presenting information for good current practice; (4) review of existing standards.

Electric Railway Terminals for City and Interurban Service—The committee considers this subject of such importance that it is submitting only general data in the form of a progress report. Among the general features which should be given careful consideration are convenience of handling passengers to and from cars or trains, attractiveness of architectural design, ample and convenient track arrangement, comfort of passengers and economical arrangement of space. In the interior arrangement consideration should be given to harmony, ventilation, sanitation and utility. The general trend today is to foster a spirit of public relations by furnishing comfortable, attractive terminals. It is recommended that the study of the subject be continued by the same committee next year.

Accompanying the report are plans of the Kenosha station of the Chicago, North Shore & Milwaukee Railroad, the interurban terminal building of the Dallas Railway, the interurban central station of the Kansas City Railway & Light Company and three plans of the Newark terminal of the Public Service Railway. The latter three have been described in issues of ELECTRIC RAILWAY JOURNAL.

In connection with the design of freight terminals, it was thought that a thorough study should be made to determine the proper location for the terminal with respect to the distribution of freight and accessibility for trucking. Provision should be made, either in the building or a possible extension thereto, to take care of future growth. The yard layout and general arrangement of track should be such as to permit of expeditiously handling cars to and from the freight house.

The building should be designed to be attractive in appearance and in keeping with other improvements on the property. It should also harmonize with surrounding improvements. The width of the freight building should not be too great, as this tends to increase the amount of handling and hand trucking. From the best information obtainable, it appears that a freight building with a platform on each side facilitates the handling of freight and is most generally recommended for this purpose. A long and rather narrow building is preferred. The recommendation of the committee is that the study of this subject also should be continued.

In a general way the remarks made in regard to passenger terminals and freight terminals apply also to combination terminals. This subject also is to be continued.

Considerable space is devoted to prepayment and postpayment inclosures. These are taken up under six headings: Change booth with automatic registering passimeter, fare booth with the registering passimeter released by the agent, change booth with registering coin box, ticket booth with cancellation box, automatic high registering turnstile, and the cashier system. These various types are discussed at length and many of them are illustrated. The committee recommends that the study of this subject be discontinued for at least a year, in order that existing types may have opportunity for further development.

Waiting Stations at Moderate Cost for Interurban Lines—The committee decided that these should be classified in three groups, open shelters, closed shelters and combination shelters.

The committee concludes that attractive waiting stations and resting places for patrons add greatly to the appearance of a property and that they do much to create public good will. They may be worth all they cost in money as well as worry. The recommendation is made that the study of this subject be discontinued.

Design of Small Bridges, Culverts and Trestles—The report of the committee goes deeply into this question, discussing pipe culverts, concrete box culverts, reinforced concrete culverts, concrete arch culverts, I-beam spans on concrete abutments, frame and pile trestles, etc. Many informative diagrams are included in the report. The discussion of the live load, dead load and impact is gone into thoroughly. The committee recommends that the typical drawings of culverts, trestles and bridges, together with the fundamental data covering their design contained in the report, be adopted as miscellaneous methods and practices, but the further study of the subject be discontinued.

Revision of Existing Standards and Recommendations—Most of this section of the report of the committee is devoted to a presentation of fire protection rules, instruction for the care and maintenance of automatic sprinkler systems, and the underwriters' rules relating to cars and carhouse wiring.

The report was signed by B. R. Brown, Charles W. Burke, J. D. Kent, James Link, L. L. Newman, J. M. Penick, S. J. Steiner, D. A. Scanlon, C. H. Clark, sponsor; John R. McKay, vice-chairman, and N. E. Drexler, chairman.

A very interesting report of the committee on wood preservation was presented by H. H. George, which was approved after the recommendations of the standards committee relative to the wood preservation committee report had been approved. The standards committee approved of the proposal of the wood preservation committee that the specification for brush treatment of wooden poles be adopted and also approved of the recommendation of the wood preservation committee that certain revisions be made in Manual section Wm 8b.

Wood Preservation

The special committee had no definite assignment, but the chairman divided its work into six subjects, covering specifications for various methods of treatment, the perforation process and a review of existing specifications. A voluminous report was presented, of which the following is a brief abstract:

Specifications for Open-Tank Treatment of Wood Poles—The committee's report includes photographs of the equipment used by several commercial open-tank pole-treating companies. The time available did not permit giving proper consideration to the subject of open-tank treating plants for the smaller pole-using companies. The committee, as a result of its studies, did not feel justified in recommending for adoption as a recommended specification and specification for open-tank pole treatment, but did include, for information only, specifications which are considered as standard in the industry for the open-tank treatment of Western red cedar and Eastern white cedar. They also included as information only specifications of the Western Cedar Pole Association for open-tank treatment of poles by the guaranteed penetration process. It is recommended that the ensuing committee be instructed to report on the question of open-tank pole-treating plants for small operating companies.

Specifications for Brush Treatment of Wood Poles—The committee submits for adoption as a recommended specification a specification for brush treatment of wood poles which covers the cases of treatment of poles subsequent as well as prior to installation. It also considered the advisability of permitting the use of a grade of creosote oil suitable for brush application as an alternative to carbolineum or oils of a similar type, and although confirming the opinion of the previous committee that the latter was the most suitable oil for brush work, it was recognized that carbolineum was not always obtainable at a reasonable cost and that the use of the next best oil would be better than not to use any preservative whatever. The committee therefore recommended that the ensuing committee be instructed to report on the desirability of preparing a specification for a suitable grade of creosote oil for brush work.

Specifications for Pressure Treatment of Wood Poles—The committee found that while general practice followed certain uniform methods, still there was considerable lack of accord on a number of details of the various pressure treating processes for wood poles and it therefore did not feel justified in taking the initiative in this field by suggesting definite specifications for adoption as recommended specifications. Drawing from its own experience, as well as data obtained from various commercial pole-treating companies and other existing specifications, the committee prepared, and submitted for information only, five specifications for pressure treatment of both green and seasoned poles, and recommended that further study of the subject be continued by next year's committee.

Specifications for Pressure Treatment of Cross-Arms—The committee, after careful consideration of this subject, felt that since a cross-arm could properly be classed as a dimensioned timber, the treatment of this material was already satisfactorily covered by the existing specifications of the association Wm 8b, and that no special specification was necessary. It therefore recommend that further consideration of this subject be discontinued.

Perforation Process for Timber Treatment—The committee incorporates in its report data bringing up to date the information as to developments in this method of treating timber and includes several photographs of machines now being used commercially in this country for this process. The committee felt that this method of treatment of timber had not become sufficiently standardized to justify making definite recommendations, except that further study of the subject be continued by the ensuing committee.

Review of Existing Specifications—The committee has carefully gone over the existing specifications of the association and has kept in close touch with the action of other technical organizations interested in the subject of wood preservation. As a result, it recommended the elimination of the clause covering specific gravity requirements from the existing recommended specifications Wm 8b for Grades 1, 2 and 3 creosote oil, creosote-coal-tar mixture, preservatives for paving block coal-tar oil, and preservatives for paving block distillate oil, and also the addition of a suitable footnote to each of these specifications to cover the question of specific gravity and the elimination of certain existing footnotes in order to make the specifications consistent with the changes now suggested. The committee also recommends certain renumbering of paragraphs in the specifications for the different grades of preservative oils.

Recommendation is also made to revise the specification for "float test" in the present recommended specifications for methods of sampling and analysis of creosote oil, as well as the complete revision of the section covering coke test in the same specification.

The committee also concurs in the recommendation that the ensuing committee be directed to consider a specification for a suitable grade of creosote oil for brush or open tank treatments as an alternative to carbolineum for use where the latter is not available.

Several papers were included as appendices, including "The Decay of Poles and the Fungi Which Cause It," prepared by C. J. Humphrey, pathologist Bureau of Plant Industry, U. S. Department of Agriculture, Madison, Wis.; "Attack on Chestnut Pole by Carpenter Ants," by Chairman Howard H. George of the committee; "Preservative Oil for Wood Floors," also by Mr. George. Through the courtesy of Earl Stimson, chief engineer of maintenance of the Baltimore & Ohio Railroad, the results of the 1923 inspection of the experimental installation of treated ties at Herring Run, Md., were published as an appendix, and through the courtesy of J. H. Waterman, superintendent of timber preservation of the Chicago, Burlington & Quincy Railroad, the results of the 1923 inspections of the experimental installations of treated ties at various points on his system also included.

The report was signed by M. J. Curtin, W. H. Fulweiler, E. F. Hartman, E. L. Morier, C. A. Smith, E. A. Hoffman, R. V. Achatz, advisory associate; R. C. Cram, sponsor; A. P. Way, vice-chairman, and H. H. George, chairman.

A written discussion on the subject prepared by Roger F. Hosford, read in Mr. Hosford's absence by Warren M. Craft, follows:

"I have been asked to discuss this report, particularly with respect to the parts dealing with brush and open-tank treatment. This report has been very carefully prepared and the committee is fully entitled to the greatest reward which you can give, which is to make use of its recommendations in your own individual practice. I feel that the two principal reasons for the failure of some brush-treating enterprises that have been based upon this experimental work of the forest service are: first, the use of insufficient quantities of preservatives, and, second, the application of the treatment to poles which had not been sufficiently prepared by seasoning to receive it. Green and partially seasoned poles will not permit of proper penetration by the preservative and also tend to open up the thinly treated layer obtained soon after they are set, since they are in no way stabilized with respect to the occurrence of checking. In the application of the brush treatment, another feature to be kept in mind is that of taking care to give the workman proper tools. For example, it is not easy to apply fluid with a brush at the level of the shoulder and avoid having some of the hot fluid reach the hand and the lower arm. A long-handled brush with a gooseneck attachment should be provided for the application of this preservative. With respect to the open-tank treatment section of the report, I have this year had occasion to work on the treatment of green chestnut, and when the time of treatment is made sufficiently long, results with respect to penetration and quantity of creosote absorbed can be obtained which are substantially equivalent to those obtained with poles which have undergone a considerable period of seasoning. The open-tank treatment does not remove all of the water from the outer layers of the butt. The successful treatment of grain poles does not imply that they can be successfully used everywhere. Climatic conditions have a vital effect upon the life of poles. The last point to which I wish to refer is the matter of "perforating" or "puncturing," the preparation for receiving open-tank treatment. This process in the past two years has become commercially available for assisting in the treatment of cedar poles. Through its assistance cedar in a particularly seasoned state, which will not take any appreciable quantity of creosote or show any appreciable depth of penetration unless it is held in an open tank for many hours in hot creosote, has been found to yield satisfactory results when held in hot preservative only the customary number of hours."

R. H. Dalgleish presented a report of the special committee on air reservoir specifications.

Specifications for Air Tanks

Several meetings of this committee were held during the year and a preliminary specification prepared. This was submitted to the equipment committee for criticism and recommendations. The committee has been in touch with the boiler code committee of the American Society of Mechanical Engineers, but has not submitted a specification to it, and feels that the specification should have the approval of the equipment committee before submitting it to the A.S.M.E. While the specification has some points on which this committee and the equipment committee do not agree, they are matters that we believe can be easily adjusted.

This committee is not prepared at this time to recommend the specification for the approval of this association, but recommends that the subject be carried over and assigned to a committee next year for completion.

The report was signed by L. J. Davis, J. A. Leeper and R. H. Dalgleish, chairman.

It was a progress report and indicated that several meetings had been held, during which a number of specifications for unheated pressure vessels had been considered. However, the committee is not ready at this time to submit a specification, recommending that the subject be continued throughout next year. It was brought out in the discussion that followed that the Bureau of Standards had made numerous tests on the various types of pressure vessels and that it would be well for the committee on this subject next year to investigate these tests. A sub-committee of the A. S. M. E. has the same matter under consideration and has been very friendly in co-operating with the association committee on this subject. The boiler code committee has assured this committee that no action will be taken without consulting it.

Wednesday's Session A.E.R.E.A.

The meeting of the Engineering Association on Wednesday afternoon was called to order by H. A. Johnson, vice-president of the association, and was turned over to W. G. Nicholson, president of the Accountants' Association, who presided during the submission of the report of the joint committee on engineering-accounting. In his opening remarks Mr. Nicholson expressed great satisfaction with joint meetings of this kind, which he said tend to foster co-operation between engineers and accountants and to encourage that harmony which is essential on each individual property.

The report of the joint committee was read by J. E. Heberle, assistant secretary Capital Traction Company, Washington, D. C., and follows:

Joint Committee on Engineering Accounting

This year the committee devoted its effort mainly to a consideration of the existing Interstate Commerce Commission classification of accounts for electric railways with the view of recommending certain fixed sub-divisions which will provide not only a better record system but will facilitate obtaining helpful cost analyses, and presented for consideration such a proposed treatment of the way and structures group of accounts. The committee recommended that its work be continued during the coming year. The number of sub-divisional accounts recommended is shown by the statement in the list below.

The report is signed by the joint commitee: A. W. Grady, J. E. Heberle, Herbert Jackson, Charles H. Lahr, Edwin D. Dreyfus, Charles Rufus Harte, sponsor; Leon R. Brown, co-chairman, and George F. Dinneen, co-chairman.

Road and Equipment Accounts

Way and structures:
Engineering and superintendence (five sub-accounts).
Right-of-way (three sub-accounts).
Other land used in electric railway operations (no sub-accounts).
Grading (five sub-accounts).
Ballast (six sub-accounts).
Ties (two sub-accounts).
Rails, rail fastenings and joints (five sub-accounts).
Special work (four sub-accounts).
Underground construction (nine sub-accounts).
Track and roadway labor (ten sub-accounts).
Paving (ten sub-accounts).
Roadway machinery and tools (no sub-accounts).
Tunnels and subways (no sub-accounts).
Elevated structures and foundations (two sub-accounts).
Bridges, trestles and culverts (eight sub-accounts).
Crossings, fences and signs (four sub-accounts).
Signals and interlocking apparatus (three sub-accounts).
Telephone and telegraph lines (four sub-accounts).
Poles and fixtures (seven sub-accounts).
Underground conduits (four sub-accounts).
Distribution system (seven sub-accounts).
General office buildings (sixteen sub-accounts).
Shops and carhouses (sixteen sub-accounts).
Stations and miscellaneous buildings (sixteen sub-accounts).
Wharves and docks (no sub-accounts).
Park and resort property (three sub-accounts).
Cost of road purchased (no sub-accounts).
Reconstruction of road purchased (no sub-accounts).
Other expenditures, way and structures (no sub-accounts).

Operating Expense Accounts

Way and structures:
Superintendence of way and structures (thirteen sub-accounts, of which seven are for track and roadway and structures and six are for electric line).
Ballast (eight sub-accounts).
Ties (three sub-accounts).
Rails (three sub-accounts).
Rail fastenings and joints (five sub-accounts).
Special work (four sub-accounts).
Underground construction (eight sub-accounts).
Track and roadway labor (forty-two sub-accounts).
Miscellaneous track and roadway expenses (two sub-accounts).
Paving (nine sub-accounts).
Cleaning and sanding track (eight sub-accounts).
Removal of snow and ice (eight sub-accounts).
Tunnels and subways (five sub-accounts).
Elevated structures and foundations (seven sub-accounts).
Bridges, trestles and culverts (nine sub-accounts).
Crossings, fences and signs (four sub-accounts).
Signal and interlocking apparatus (five sub-accounts).
Telephone and telegraph lines (six sub-accounts).
Miscellaneous way expenses (no sub-accounts).
Poles and fixtures (twelve sub-accounts).
Underground conduits (three sub-accounts).
Distribution system (twenty-seven sub-accounts).
Miscellaneous electric line expenses (no sub-accounts).
Buildings, fixtures and grounds (twenty sub-accounts).
Depreciation of way and structures (twenty-five sub-accounts).
Other operations—Dr.
Other operations—Cr.
Equalization—way and structures.

In presenting this report Mr. Heberle indicated that the report was submitted as tentative for the purpose of inviting discussion of this important subject. Mr. Nicholson stated that accurate costs are of particular importance today due to the conditions which exist in the railway industry. M. W. Glover, general auditor West Penn Railways, stressed the advantages to be obtained from co-operation between engineers and accountants. He felt that the duty of handling all general accounts should be entirely in charge of the accountant, but subdivisions for obtaining cost data should be compiled in co-operation with the engineering department. He further expressed the fear that the committee report shows such minute subdivision as to make the accuracy of charges suffer due to the difficulty of training foremen to charge work to the proper accounts.

This same question was raised by C. H. Jones, electrical engineer, Chicago Elevated Railways, who maintained that subdivision of accounts should not be carried to the point where the foreman is required to spend a large amount of his time on clerical duties. T. B. MacRae, general auditor Chicago Elevated Railroads, illustrated the difference in the viewpoints of the accountant and the engineer by pointing out that the accountant thinks in figures, whereas the engineer desires a complete picture of a given situation. In order to maintain the desired contact between the two departments, this property has an engineering auditor who is in a position to compile cost information in the way which is most desirable for the purposes of the engineering department. Mr. MacRae questioned the use of the word "depreciation" in the committee's report and preferred the term "reserve" to indicate more accurately the function of this group of accounts.

The ruling of the United States Supreme Court which fixes the value of a property at the time the rates are made as the proper basis for rate making was given by C. R. Harte, construction engineer the Connecticut Company, as a primary reason in favor of accurately subdivided cost accounts. He stated that a knowledge of past costs is essential to the compilation of existing values for rate-making purposes. This value, he stated, can be set up only when cost figures of the property are also available in terms of man-hours and materials. In carrying out the work of cost keeping he felt that the engineer should co-operate in preparing the schedule of subdivisions and that the accountant should keep the records. Mr. Harte expressed satisfaction with the report of the committee as an initial step in the study of this problem and as a basis for further discussion and work.

Further discussion by H. H. George, engineer maintenance of way Public Service Railway; Herbert Jackson, supervisor underground lines Washington Railway & Electric Company, and Mr. Nicholson brought out the difficulty of properly making charges when accounts are too much subdivided, but emphasized the importance of carrying this subdivision as far as practicable. W. B. Yereance, consulting engineer, South Orange, N. J., commented on the report of the committee and pointed out that it fulfills the proper function of such a paper in that it outlines the general principles involved in the problems considered. The compilation of detailed accounts, he felt, was a matter largely governed by the local conditions existing on the individual properties. He agreed that the services of an engineer in the auditing department provides for the necessary co-operation between the two departments on a large property and advocated frequent council meetings as a means of obtaining similar co-operation on smaller properties. He stated that detailed cost figures on specific jobs should be furnished by the auditor, but that such reports should be prepared only as long as the information is of value and then should be discontinued.

Mr. Harte, Mr. Spencer, Mr. Nicholson and Mr. Heberle concluded the discussion by taking up the question of charges for new construction and the division of charges between capital and maintenance accounts. It was the general opinion that the engineering department should co-operate in this work by indicating as far as possible the proper classification for work performed and that there should be a mutual responsibility. The report was accepted by the association and it was agreed that the work of this committee should be continued.

The report of the committee on way matters was abstracted by W. F. Graves, chairman.

Way Matters

Seven subjects are discussed in the report including one outstanding subject, viz., the review of existing standards. Conclusions and recommendations are submitted on all of the subjects assigned.

Standardization of Frogs—This subject has been considered by the committee on way matters since 1910 and revisions made from time to time, as the study of the subject developed. It is felt that the required number of frogs can be considerably reduced, probably by a process of elimination, that the subject warrants further study, and that definite recommendations can be made in another year. After carefully considering and reviewing the previous work, this year's committee made recommendations as to several revisions which should be incorporated in the Manual.

Car Clearance Easements—This subject was thoroughly considered and reported on in 1922 and the present committee considers it can go no further in this study from its standpoint. The subject should be discontinued as a way subject, but steps should be taken by the executive committee to appoint way engineers on the committee on unification of car design.

Design of Substitute Ties—A progress report is submitted and the results of an investigation into the records of the United States Patent Office are given. Co-operation with the American Railway Engineering Association has been obtained by the appointment of a way engineer to represent the association on the tie committee of the American Railway Engineering Association, whereby benefit may be had from its extensive and thorough study of this subject. The subject of the design of substitute ties, particularly for use in paved streets, should be continued. A thorough investigation and study should be made of the substitute ties now available, the degree to which they have been used and the results of their use.

Design of Small Bridges, Trestles and Culverts—With a view to presenting information on good current practice, this subject was considered jointly with the committee on buildings and structures. The conclusions reached are stated in the report of the latter committee. It is the opinion that the subject cannot receive from two large committees the careful attention that it merits, and that it could be more satisfactorily handled by one committee. The subject of bridge, culvert and trestle design is one primarily concerning way engineers, these structures being generally designed and constructed by them. It is therefore recommended that the study of this subject be continued and that it be assigned to the ensuing committee on way matters. It is recommended that its further study by the committee on buildings and structures be discontinued.

Design of Track Construction for Paved Streets—A specification is submitted which is recommended for adoption. A similar recommendation is to be made by a concurrent committee of the American Society for Municipal Improvements, with which this committee co-operated. These specifications are very complete, covering the subjects of excavation, top soil and surface drainage, types of foundation, rails, rail joints, bonds, rail fastenings, ties, pavement base, rail filler and pavement. It is recommended that the further study of this subject be discontinued.

Welded Rail Joints—The welded rail joint committee of the American Bureau of Welding having been organized to pursue the scientific investigation of this subject in 1922, the subject was not assigned to the 1923 committee on way matters except to co-operate with the welded rail joint committee.

The most important work, that of securing funds for financing the work, was done after the report was prepared. The sum of $10,000, appropriated at the convention in Chicago, has been supplemented by contributions from individual railway companies and manufacturers, so that the total fund subscribed up to July 1, 1923, amounted to $23,477.

The first step in the actual testing of joints is the testing at various institutions of sample joints made up by certain railways in accordance with their own standards. The railway companies which will make up these joints have been selected so that samples will be secured representative of the four principal methods of welding, viz., cast-welded joints, thermit joints, seam-welded joints, Lorain bar weld and buttweld. Each company has been instructed to make twelve joints under actual service conditions, shipping six specimens to the Bureau of Standards, Washington, for tensile and repeated impact test, three specimens to Purdue University for cross-bending tests and three specimens to the University of Illinois for drop tests. A number of companies have made and forwarded these sample joints, but at the time the report was written no actual tests had been made.

The Emery machine at the Bureau of Standards will be used for tensile tests. It is not equipped with heads which will take the full rail section, and it has therefore been necessary in the past to plane away a portion of the head and base of the rail in order to insert it in the machine. This has resulted during a number of previous tests made by the bureau, in the breaking of the rail where it was weakened by the planing, thus precluding the completion of the test. In order to overcome this difficulty, the committee has designed and built special grips for the testing machine, which will permit testing the full section without cutting.

One of the most important tests considered by the committee is the repeated impact test. But the committee has been unable to find any form of testing machine entirely suitable for this work. However, considerable research has been done along this line by E. J. McIlraith, Chicago Surface Lines, and an ingenious method of determining the impacts caused by car wheels has been developed.

SPECIAL TEST TRACK DEVELOPED

Final plans of the rotary machine, designed for testing joints in circular tracks under as nearly service conditions as possible, were adopted and an appropriation was made to cover the estimated cost. In addition to the tension, bending, impact and service tests contemplated, there will be a number of special tests, such as measuring impact by Smith's decelerometer, tests for hardness and abrasion, microscopic examination and chemical analysis of weld metals.

This is one of the most important subjects for way engineers at the present time and warrants a great deal of further study and investigation. This committee recommends that the subject be assigned to the ensuing committee for further report.

Review of Existing Standards—In view of the pending revision of the Engineering Manual, the committee made a thorough review of the way matter specifications. Numerous recommendations for additions, changes and withdrawals from the Manual were made.

The more important ones are that the executive committee appoint a special committee to co-operate with all other committees of the Engineering Association to recommend a specification for "symbols for recording surveys"; that the ensuing committee on way matters be instructed to submit a design and specification covering "standard design and specification for

TABLE I—ANALYTICAL METHOD—TOTAL POWER SUPPLY AND DISTRIBUTION COST PER KILOWATT, ARRANGED AS TO DISTRICTS OF VARYING LOAD DENSITIES

		L.D. = 160		L.D. = 80		L.D. = 40		L.D. = 20		L.D. = 10		L.D. = 5	
Units	Power Supply Cost	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total	Distribution Cost	Total
1-1,000	$10.67	$1.05	$11.73	$1.49	$12.16	$2.11	$12.78	$2.98	$13.65	$4.22	$14.89	$5.96	$16.63
1-1,500	9.67	1.26	10.93	1.78	11.45	2.52	12.19	3.56	13.23	5.04	14.71	7.12	16.79
2-1,000	10.47	1.49	11.96	2.10	12.57	2.97	13.44	4.20	14.67	5.94	16.41	8.40	18.83
1-2,000	8.90	1.42	10.32	2.01	10.91	2.84	11.74	4.02	12.92	5.68	14.58	8.03	16.97
1-2,500	8.17	1.56	9.73	2.21	10.38	3.12	11.29	4.42	12.59	6.25	14.42	8.83	17.00
3-1,000	10.38	1.82	12.20	2.58	12.95	3.64	14.02	5.16	15.54	7.30	17.68	10.30	20.68
2-1,500	9.57	1.78	11.35	2.51	12.08	3.58	13.15	5.03	14.60	7.10	16.67	10.05	19.62
1-3,000	7.43	1.67	9.10	2.37	9.80	3.34	10.77	4.73	12.16	6.70	14.13	9.46	16.89
2-2,000	8.73	2.01	10.74	2.84	11.57	4.02	12.75	5.69	14.42	8.05	16.78	11.38	20.11
3-1,500	9.50	2.17	11.67	3.07	12.57	4.34	13.84	6.14	15.64	8.68	18.18	12.30	21.80
2-2,500	8.04	2.21	10.25	3.13	11.17	4.42	12.46	6.25	14.29	8.83	16.87	12.50	20.54
3-2,000	8.69	2.46	11.15	3.48	12.17	4.92	13.61	6.96	15.65	9.85	18.54	13.90	22.59
2-3,000	7.30	2.37	9.67	3.37	10.67	4.73	12.03	6.70	14.00	9.47	16.77	13.40	20.70
3-2,500	7.99	2.70	10.69	3.84	11.83	5.42	13.41	7.65	15.64	10.82	18.81	15.30	23.29
3-3,000	7.26	2.90	10.16	4.12	11.38	5.80	13.06	8.21	15.47	11.60	18.86	16.42	23.68

solid manganese steel electric over steam railroad crossing" and co-operate with the committee on tracks of the American Railway Association.

It was also thought that the sectional committee of the A.E.S.C. having in hand the design of plain girder rails for use in paved streets should broaden its scope to include the design of joint plates suitable for use with those rails, and that the size and number of holes, length of plates, etc., be standardized.

The ensuing committee on way matters should be instructed to submit a specification "rules for determining the gage of track on curves," having in mind the work of the special committee on wheel and rail head contours.

The report was signed by C. A. Alden, V. Angerer, S. Clay Baker, W. R. Dunham, E. B. Entwisle, G. C. Estill, R. B. Fisher, H. Fort Flowers, A. E. Harvey, J. H. Haylow, E. M. T. Ryder, A. T. Spencer, F. Tingley, J. B. Tinnon, W. W. Wysor, C. F. Gailor, secretary; H. H. George, vice-chairman; W. F. Graves, chairman, and R. C. Cram, sponsor.

In the discussion of this report Howard H. George, engineer maintenance of way Public Service Railway of New Jersey, explained the results of several meetings with the American Society for Municipal Improvements in deciding upon the specifications for street railway track construction. The specifications submitted with the report on way matters will be presented to the American Society for Municipal Improvements for action at its 1923 convention.

V. Angerer, vice-president William Wharton, Jr., & Company, Inc., explained the co-operation which the committee on way matters had with the way and track committees of the American Railway Association. W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore, Md., gave an abstract of subject No. 5 of the report on way matters relating to the work of the committee on welded rail joints. He supplemented this by an outline of the work which had been accomplished by the committee on welded rail joints in co-operation with the American Bureau of Welding and gave information as to progress which had been made since the report of the committee on way matters had been printed.

The report of the committee on way matters was approved for all subjects except No. 6, and in this the recommendations of the standards committee were approved. A vote of appreciation was recorded for the excellent co-operation of member companies in making up track joints for tests.

The report of the committee on automatic substations was abstracted by Walter E. Bryan, chairman of the committee.

Automatic Substations

The committee assigments were: (A) To outline a method or methods for studying the economics of the subject, which will serve as a guide for the study of any particular situation. (B) On the basis of the above outline, study and work out a number of specific examples, comparing costs and merits of different power distribution layouts. (C) To determine, if possible, the economic limits to which track drops can be reduced.

In connection with assignment A, the committee also undertook a study of the trolley voltage most advisable for congested districts.

ECONOMIES OF SUBSTATION LOCATION

It has been rather general practice in previous studies to draw up comparisons between plans involving various sizes and grouping of units on what might be termed a practical or "cut-and-try," basis. The present committee felt that more satisfactory comparisons might be obtained by the use of an analytical method, based on an idealistic and uniform arrangement of the distribution feeders. There are situations, however, where such a method would not apply, and recourse must be had to the so-called practical method. The committee, therefore, submitted both methods.

First Method — The particular advantage of the analytical method lies in the fact that the results are based on a uniform system of distribution and the preliminary results, therefore, are more truly comparable than if the distribution feeders were designed at the start on the requirements of the individual lines. After the completion of the analytical study, detailed layouts would have to be made, which, however, would be confined to those substations set-ups which from the analytical study, showed the greatest economy.

The analytical method has its principal field of usefulness where a study is being made of a large urban system, or where the district under consideration has a fairly uniform load density. The results cannot be assumed to be conclusive, but may be materially modified by the supplementary detailed studies. The method readily lends itself, however, to a comparison of sizes and combinations of units extending over a wide range.

The measure of economy is taken as the summation of annual costs per kilowatt delivered at the car. These costs are subdivided under "Power Supply" and "Power Distribution." Values of distribution voltage, load per feeder, etc., are assumed, together with unit costs of construction and operation, as governed by local conditions. The study shown covers substations ranging from 1,000 kw. to 9,000 kw. in capacity, it being felt that stations larger than 9,000 kw. would undoubtedly be manually operated. Commercial sizes of converters from 1,000 kw. to 3,000 kw. are considered.

The committee prepared a set of tables as a part of its study, showing the various steps in the calculation for the range of capacities mentioned. Similar tables would have to be made up for any particular case. These tables include the assumed unit value and cost; annual cost for power supply and annual cost for distribution, based on standard meters.

Table I, reproduced herewith, sums up the cost of power supply and power distribution, arranged as to districts of varying load density. The cost of power supply is independent of load density, while it is evident that the cost of distribution will vary with the load density of the district served, varying inversely as the square root of the density.

Table II is a summation of the investment cost of the power supply and power distribution units. Similar to the distribution costs shown in Table I, distribution investment is inversely proportional to the square root of the load density. Hence, if the load density of any district is known, the approximate first cost of any contemplated arrangement may be obtained.

TABLE II—ANALYTICAL METHOD—INVESTMENT COSTS PER KILOWATT

	Investment per Substation					Investment in Distribution L.D. = 143				Distribution Investment per Kilowatt Total Investment, per Kilowatt — Variable Density					
Units	Electrical Equipment	Building	Site	Total	Per Kw.	Feeder	Added Electrical Equipment	Total	Per Kw.	L.D. = 160	L.D. = 80	L.D. = 40	L.D. = 20	L.D. = 10	L.D. = 5
1-1,000...	$32,000	$8,000	$5,000	$45,000	$45.00	$2,000	$560	$2,560	$2.56	$2.41 47.41	$3.41 48.41	$4.82 49.82	$6.82 1.82	$9.64 54.64	$13.64 58.64
1-1,500...	45,000	10,000	5,000	60,000	40.00	3,000	788	3,788	2.53	2.93 42.93	4.15 44.15	5.86 45.86	8.30 48.30	11.72 51.72	16.60 56.60
2-1,000...	64,000	14,400	9,000	87,400	43.70	4,000	1,120	5,120	2.56	3.42 47.12	4.84 48.54	6.84 50.54	9.68 53.38	13.68 57.38	19.36 63.06
1-2,000...	56,000	12,000	9,000	77,000	38.50	4,000	980	4,980	2.49	3.32 41.82	4.70 43.20	6.64 45.14	9.40 47.90	13.28 51.78	18.80 57.30
1-2,500...	65,000	13,500	10,000	88,500	35.40	5,000	1,135	6,135	2.45	3.66 38.06	5.18 40.58	7.32 42.72	10.36 45.76	14.64 50.04	20.72 56.12
3-1,000...	96,000	20,800	12,000	128,800	42.20	6,000	1,680	7,680	2.56	4.18 47.38	5.91 48.11	8.36 50.56	11.82 54.02	16.72 58.92	23.64 65.84
2-1,500...	90,000	18,000	12,000	120,000	40.00	6,000	1,575	7,575	2.53	4.13 44.13	5.84 45.84	8.26 48.26	11.68 51.68	16.52 56.52	23.36 63.36
1-3,000...	72,000	15,000	12,000	99,000	33.00	6,000	1,260	7,260	2.42	3.96 36.96	5.60 38.60	7.92 40.92	11.20 44.20	15.84 48.84	22.40 55.40
2-2,000...	112,000	21,600	14,000	147,600	36.90	8,000	1,960	9,960	2.49	4.69 41.59	6.64 43.54	9.38 46.28	13.28 50.18	18.76 55.66	26.56 63.46
3-1,500...	135,000	26,000	16,000	177,000	39.33	9,000	2,360	11,360	2.52	5.04 44.37	7.13 46.46	10.08 49.41	14.26 53.59	20.16 59.49	28.52 67.85
2-2,500...	130,000	24,300	16,000	170,300	34.06	10,000	2,280	12,280	2.46	5.19 39.25	7.34 41.40	10.38 44.44	14.68 48.74	20.76 54.82	29.36 63.42
3-2,000...	168,000	31,200	19,000	218,200	36.37	12,000	2,940	14,940	2.49	5.76 42.13	8.15 44.52	11.52 47.89	16.30 52.67	23.04 59.41	32.60 68.97
2-3,000...	144,000	27,000	19,000	190,000	31.67	12,000	2,520	14,520	2.42	5.59 37.26	7.91 39.58	11.18 42.85	15.82 47.49	22.36 54.03	31.64 63.31
3-2,500...	195,000	35,100	22,000	252;100	33.61	15,000	3,410	18,410	2.45	6.38 39.94	8.95 42.56	12.66 46.27	17.90 51.51	25.32 58.92	35.80 69.41
3-3,000...	216,000	39,000	24,000	279,000	31.00	18,000	3,780	21,780	2.42	6.85 37.85	9.68 40.68	13.70 44.70	19.36 50.36	27.40 58.40	38.72 69.72

Use of First Method—Assuming that a study is to be made of a district serving a demand load of 6,000 kw. from a load density of 160 kw. per 1,000,000 sq.ft., and that Table I is applicable to the case in point, it is evident that there are combinations to be considered, neglecting those combinations requiring the use of more than one kind of unit. These combinations are set forth in Table III.

The first and second plans show the greatest economy, but as only two units are required to feed the total load in either case, continuity of service would be jeopardized if either the first or second plan was adopted. Plan No. 9 involves the use of three-unit stations, and would undoubtedly be eliminated. Plan No. 8 would probably also be eliminated on account of its relatively high cost.

This leaves Plans Nos. 3 to 7, inclusive, for consideration. The maximum difference in annual cost is $1.41 per kilowatt of capacity, making a total for the 6,000 kw. area, of $8,460. Quite a range as to number of stations is provided, the range being from one to six stations. Single-, double- and triple-unit stations remain in the list, although the triple-unit stations (Plan No. 5) would probably be eliminated for practical reasons. The use of four machines would tend to insure reasonable reliability of service, and it will be noted that Plan No. 4, four single-unit stations with 1,500-kw. rotaries, has a comparatively low annual cost.

Having eliminated, for the reasons given, five of the plans, the engineer would proceed to make a detailed study of each of the remaining plans. These studies would include in each case the tentative selection of sites, the laying out in detail of complete distribution and transmission systems, and the computation of fixed charges and power loss costs on the basis of the revised layout.

Having brought this economic study to a conclusion, the engineer would next consider certain practical points which might affect the ultimate selection from an operating standpoint. Among such points might be mentioned: (a) Desirability of two-unit as compared with single unit-stations; (b) desirability of the use of a certain size and type of unit; (c) availability of substation sites; (d) availability of underground conduit for transmission cable; (e) the importance of electrolysis mitigation.

Second Method — The difference between the second method—which might be termed a practical (as distinguished from an analytical) method—and the first method, is, briefly stated, that under the first method consideration is given to practically all possible sizes and combinations of units in the preliminary analytical study, whereas under the second method the tentative selection of one or two sizes at once eliminates others from the preliminary study.

The second method readily lends itself to the study of small areas or areas of varying load density. The engineer in many cases is confronted with the problem of relieving an existing station of overload by the installation of an automatic station at some point in the district served by the existing station. Under these circumstances the size and general location of the new station are fixed by conditions, and an abbreviated type of study along the lines of the second method is all that is necessary.

The method, as set out below, follows what has been rather general practice in such studies, and the committee has simply endeavored to set down in concrete form the cardinal points of such a method By its very nature, the method is a flexible one and permits of variation (as dictated by local conditions) as the study progresses

Outline of Second Method — 1. Prepare a complete table of the costs, load constants, etc., entering into the calculation.

2. Prepare a car spot diagram (say on a maximum half-hour basis) for the area to be served and divide into feeder sections of sizes determined by load density, traffic conditions and other practical considerations. Determine the load and center of load for each section, checking the former, where possible, by ammeter readings at existing stations.

3. If the size of the general area under consideration warrants, divide the entire area into two or three districts, i.e., heavy-, medium- and light-load districts, as determined by the load density in various sections.

4. Assume, tentatively, a size of unit best fitted, from a practical standpoint, for the particular district under consideration and by the center of load method fix the theoretical location of each unit.

5. On the basis of the locations as determined, lay out the distribution system, designing the various feeders with regard to load to be carried, voltage drop, equalizing capacity between stations, etc., and using commercial sizes of wire.

6. Design the transmission system, basing calculations upon capacity required for normal service and making proper allowance for continuity of service in case of cable failure.

7. On the basis of the calculations outlined above, draw up a table showing the first costs and annual costs of the various layouts.

8. Up to this point the calculations have been based on one size of unit (for each district), arranged in single-unit and perhaps two-unit stations. The results derived may indicate the advisability of assuming a second size and making additional layouts on this basis.

9. Having brought the study to this point economic comparisons for a number of combinations are available. Further consideration must then be given to the practical merits of the various plans.

Specific Examples—It will be evident to those who have made such studies that the working out in detail of a specific example involving a large area is quite a task. Time did not permit of the application of the first method to a specific study, although it is believed that sufficient explanation has been given to make the method clear. A specific example showing the use of the second method, however, was worked out in detail.

The Economic Limits to Which Track Drops Can Be Reduced—Assuming that the track bonds are in good condition there are three principal methods of reducing track potential gradients: first, by installing cable in parallel with the rail; second, by an insulated return system and third, by increasing the stations feeding a given area.

The first two methods require the use of additional copper cable. It is evident that if the current flow in such cable is below the economic value, the use of the wire, while perhaps advisable from the standpoint of reduction of rail gradients, cannot be justified from a purely economic point of view.

Based on the data used in the specific cases included in the report, the peak load value of current for a 1,000,000 circ.mil cable which gives the greatest economy (balancing fixed charges against power losses) is 600 to 700 amp. Such a current will produce a drop of 6 or 7 volts per 1,000 ft. of cable.

If we assume a double track line with four rails, each equal to 1,000 000 circ.mil of copper wire, and having a potential gradient of 7½ volts per 1.000 ft., it is apparent that the installation of one 1,000,000 circ.mil cable in parallel with the rails will reduce the gradient to 6 volts, which is equivalent to a flow of 600 amp. in the cable. This result leads to the conclusion that where track gradients are below the figure assumed, the installation of parallel copper is not justifiable from an economic standpoint.

If the negative feeders in an insulated return system are designed to carry approximately 600 or 700 amp. (maximum) per 1,000,000 circ.mil, the negative drop to the bus will be higher than in the case of an uninsulated system and the negative power loss, therefore, greater. The potential gradients which ordinarily obtain on uninsulated systems are of such value that any reduction by means of an insulated return system can only be made at a financial sacrifice.

As to the third method, namely an increased number of stations, the committee is of the opinion that any layout of substations, which is justified from an economic standpoint, would result in track gradients of such value as practically to eliminate danger from electrolysis.

The matter might be summed up as follows:

As a general thing, the reduction of track gradients by the use of parallel feeders or an insulated return system can only be accomplished at the sacrifice of economy. The use of automatic stations, due to the increased number which can be justified, will reduce track gradients to values which from an electrolysis standpoint are safe.

An increase in the number of distribution centers in heavily congested districts with attendant increase in trolley voltage, has, in one or two specific instances, resulted in an increase in demand load and energy consumption. This is due to the fact that whereas an increase in the number of stations reduces feeder losses, the increased voltage results in higher rheostatic losses at the car which may more than offset the saving in feeder losses.

In districts where the distance between stops is relatively long and vehicular traffic light, considerable free running is possible and the benefits of high voltage can be realized. This is not the case, however, in congested districts, where schedule speeds are dependent very largely upon general traffic conditions.

Data obtained under actual service conditions indicate that the schedule speeds possible in heavily congested districts can be obtained with a trolley voltage materially lower (150 to 200 volts) than the general or system voltage. It is evident, however, that satisfactory operating conditions, at street intersections for instance, require more than 400 or 450 volts.

Tests taken under service conditions also indicate that for congested districts, voltages between 400 and 500 result in the greatest power economy, due to the low rheostatic losses. These tests bear out the statement that increased voltage increases power costs.

INTERCONNECTION OF STATIONS COMMON

It is general practice to interconnect adjacent stations through tie feeders, and the difference in bus voltage at the various stations under such conditions is limited by the feeder design, particularly where compound-wound converters are used. The use of shunt-wound converters, however, provides a very satisfactory means of regulating the voltage, for at times of heavy load the voltage is automatically lowered, while at times of light load (when traffic is lighter and advantage can be taken of high voltage) the voltage is reduced comparatively little.

It is impossible to name a figure which will satisfy all elements of the problem under various conditions. A voltage of from 500 to 550, however, seems sufficiently high to satisfy service requirements, although due to interconnection of stations a bus voltage much below 550 volts (based on a general system voltage of 600 volts) could hardly be obtained. The committee simply wishes to call attention to the fact, first, that comparatively low voltages are possible in heavily congested districts without impairment of service, and second, that increase of voltage in such districts, although of no benefit, will result in increased costs of power, particularly demand charge.

The report was signed by C. A. Butcher, J. M. Drabbelle, C. H. Jones, F. W. Peters, E. H. Scofield, L. D. Bale, and W. E. Bryan, chairman.

TABLE III—COMPARISON OF VARIOUS COMBINATIONS TO SUPPLY A DISTRICT WITH A DEMAND LOAD OF 6,000 KW. AND A DENSITY OF 160 KW. PER 1,000,000 SQUARE FEET.

Plan	No. of Stations	No. of Units per Station	Total No. of Units	Capacity of Units, Kw.	Total Cost per Kw. of Capacity
1	2	1	2	3,000	$9.10
2	1	2	2	3,000	9.67
3	3	1	3	2,000	10.32
4	4	1	4	1,500	10.93
5	1	3	3	2,000	11.15
6	2	2	4	1,500	11.35
7	6	1	6	1,000	11.73
8	3	2	6	1,000	11.96
9	2	3	6	1,000	12.20

In the discussion following the presentation of this report Adrian Hughes, Jr., superintendent of power United Railways & Electric Company, Baltimore, Md., told of the studies which were being made in Baltimore in regard to the use of automatic substations. He brought out the fact that local conditions govern the solution of the problem, and he suggested that the work of the committee on automatic substations be continued.

A written discussion by R. L. Weber, electrical engineer Kansas City Railways, was read by G. C. Hecker, special engineer of the American Electric Railway Association. This discussion described an analysis of substation requirements and location as carried out in Kansas City and results of a study that had been made.

Ralph H. Rice of the Board of Supervising Engineers, Chicago, Ill., presented several curves showing costs of substations as the number is increased. He also presented data he had worked out to show how the distribution costs vary with the number of substations. These figures were obtained by applying the methods recommended by the committee on automatic substations and included in the report.

D. D. Ewing, professor of electric railway enginering Purdue University, said that the fundamental basis of the power problem should be kept clearly in mind in arriving at any particular conclusions, and that various theoretical methods used would be influenced largely by fundamental considerations.

M. B. Rosevear, superintendent of distribution Public Service Railway of New Jersey, said that to him the outstanding feature of this committee's report, and, in fact, of previous reports of other committees dealing with this subject, was the great economy that resulted from the use of automatic substations and the increased advantages that accrued from their use.

The report of the committee on automatic substations was accepted with a vote of appreciation for the work done and for the additional points that had been brought out in the discussion. The meeting then adjourned.

Thursday's Session A.E.R.E.A.

The report of the committee on power distribution was abstracted by M. B. Rosevear, chairman, except for subjects 1, 2, 4 and 8, which were abstracted by sub-committee chairmen. Subject No. 1 was abstracted by Charles H. Jones, electrical engineer Metropolitan West Side Elevated Railway, Chicago, Ill.; subjects 2 and 4 by H. S. Murphy, assistant electrical engineer Philadelphia Rapid Transit Company, and subject 8 by Adrian Hughes, Jr., superintendent of power United Railways & Electric Company, Baltimore, Md. Each subject was represented separately and discussed before proceeding to the following subject.

Power Distribution

The report of the committee on power distribution is divided into five principal subjects, dealing with catenary overhead construction, trolley wire specifications, pole reclamation, specifications for low conductivity trolley wire, industrious co-ordination, temporary connections to trolley wire, overhead construction for trackless trolleys, and review of existing standards. A list of power distribution matters which are being considered by other special committees and by sectional and technical committees under the auspices of the A. E. S. C. is also included.

The committee recommends that subjects assigned for 1924, in addition to those which should be continued, are concrete poles, return circuits, including bonding, standard approach ears or flexible tips, at least the ruling dimensions, standardize various types of suspensions, particularly the ruling dimensions.

Specification for Catenary Overhead Construction.—The sub-committee has prepared a detailed specification for catenary overhead construction, other than for steam railroad electrification. This specification deals primarily with the trolley wire and its supporting catenary system. The various paragraphs cover the supporting system, car clearances, trolley height, spacing of poles and pullovers, with accompanying diagrams and tabulations. The method of locating trolley wire on curves is given, with tables and graphic charts from which may be readily computed the offset required for various conditions as to trolley height, super-elevation and curvature of track, height of car and length of pole. Other graphic charts are included giving the relation between sag and tension in loaded and unloaded messengers for pole spacings from 150 to 300 ft. for steel messenger and for 300 ft. spacing for copper messenger. Temperature correction charts are included in every instance. The method of using all curves is completely explained in the text.

The specifications also include sag-tension curves for trolley wire under similarly varying conditions and cover auxiliary contact wires, hangers, steady strains, anchors and feed taps.

It is recommended that the specification be approved as a miscellaneous method and practice, and that the committee for next year be instructed to put the specification in final form for submission as a recommended specification to the 1924 convention.

It is also recommended that the 1924 committee be instructed to prepare specifications for catenary suspension materials.

Trolley Wire Composition and Wear. Specifications for Round and Grooved Hard-Drawn Copper Trolley Wire.—The sub-committee has compiled data relative to trolley breaks from information submitted by twelve companies, well distributed geographically. These data cover 3,300 trolley breaks, for 5,300 miles of overhead line, over a maximum period of two years. Three tabulations are included: (1) Trolley breaks per mile of single track, (2) analysis of causes of trolley wire failures, (3) summary of causes of trolley wire failures.

These are followed by quoted recommendations of distribution engineers from widely separated geographical locations as to methods of reducing the number of failures.

There is a discussion of the need of securing further data, particularly of a quantitative nature, and a broad research program is proposed, including:

1. The preparation of detailed information by distribution engineers of member companies.

2. The writing of a detailed history of at least one complete section of trolley wire by co-operating member companies.

3. Co-operation with committee on welded rail joints using proposed rotary service testing machine to make comparative tests on various kinds of trolley wire, fittings and collector devices.

4. Employment of a research engineer, or founding a research fellowship at some university, to study the manufacture and use of trolley wire, with such laboratory work as necessary.

As a result of joint action with the American Society for Testing Materials, a revised specification for hard-drawn copper trolley wire is presented.

It is recommended that: (1) The study of trolley wire wear be continued, including causes of wear and failure. (2) The proposed research program be approved and undertaken. (3) The revision of specification Dw 3b, for round and groved, hard-drawn copper trolley wire be approved. (4) Appropriate action be taken, so that the revised trolley wire specification may be presented to the American Engineering Standards Committee for approval, if possible, as an American standard. The American Society for Testing Materials to be invited to join with our association in presenting the matter to the A. E. S. C.

Pole Reclamation. — Reference is made to the report of the committee on wood preservation, particularly that portion relative to treatment of wood poles after erection.

It is recommended that further study of pole reclamation be dropped for the present.

Specifications for High Strength, Low Conductivity, Trolley Wire.—Reference is made to a study of existing specifications and discussion with the American Society for Testing Materials sub-committee.

Certain tentative values for tensile strengths and twist tests of high-strength trolley wire are submitted, in order to promote discussion.

It is recommended that the A. E. R. E. A. join the A. S. T. M. in requesting the appointment of a sectional committee under the auspices of the A. E. S. C. to prepare an American standard specification for high-strength trolley wire.

Inductive Co-ordination.—The sub-committee has studied and discussed this subject, including certain data jointly promulgated by the National Electric Light Association and the Associated Bell Telephone Companies. Certain information has been gathered from member companies and an additional questionnaire prepared for use by their representatives if and whenever an American committee is formed by various interested national bodies. If the American committee is formed the sub-committee can render such assistance to its representatives as necessary.

It is recommended that the study of inductive co-ordination be continued. If no American committee is formed, it is recommended that the committee on power distribution be authorized to co-operate with proper committees of other national bodies.

Temporary Connections to Trolley Wire.—Data have been collected as to various devices now in use for temporary connections to trolley wire, particularly for welders and other apparatus drawing heavy currents.

The sub-committee describes and illustrates several typical devices which it is believed prevent damage to the trolley wire if properly used.

It is recommended that the subject be continued for another year.

Overhead Construction for Trackless Trolley.—The sub-committee presents information relative to overhead construction for trackless trolley, together with typical illustrations.

It is recommended that the subject be continued for another year.

Review of Existing Standards—The committee submits a detailed discussion of each section of the manual under the heading "Power Distribution." In the main, no changes are suggested, but the following recommendations are made:

Df 2b—Specification for galvanizing or sherardizing on iron and steel. This should be included in the new manual with an explanatory note that it has been referred to the A. E. S. C.; that some objections to the present specification have been raised; and that it would probably be revised to some extent by a sectional committee before being approved.

Ds 2c—Specification for 600-volt direct-current overhead trolley construction. In the new Manual there should be added an introductory paragraph referring to other specifications for materials such as Df 4d, overhead line materials; Ds 3c, selection of poles; etc.

Dw 1c — Standard grooved trolley wire sections. This section should be withdrawn from the manual when the revision of specification Dw 3b for round and grooved, hard-drawn, copper trolley wire is approved.

Block Signal Specifications. — The committee discusses the need of referring signal matters to some specific committee. It has reviewed existing signal specifications and submits its recommendations on account of the pending republication of the manual.

It is recommended that:

1. The question of assigning block signal matters to either the committee on power distribution or to a special committee be referred to the executive committee for decision.

2. The following sections be withdrawn from the Manual because of changes in the art and pending action by a committee during 1924:

Ss 7b—Use of continuous track circuits for the control of automatic signals for high speed interurban service.

Ss 8a—Methods of signaling single-track suburban railways for headway between 5 and 20 minutes and speed not exceeding 20 m.p.h.

Ss 9a—Methods of signaling double-track suburban railways for headway between 1 and 10 minutes and speed not exceeding 30 m.p.h.

Ss 10a—Methods for signaling single-track interurban railways for headway not less than one hour and speed 40 to 60 m.p.h.

Ss 11a—Methods for signaling single-track interurban railways for headway as frequent as 15 minutes for trains in several sections and speed 40 to 60 m.p.h.

Ss 12a—Methods for signaling double-track interurban railways for headway as frequent as 5 minutes and speed 40 to 60 m.p.h.

Ss 13a—Sizes of lenses for use in light signals.

3. The other signal sections in the manual be carefully reviewed during 1924.

The report was signed by J. Walter Allen, Robert L. Allen, S. H. Anderson, L. W. Birch, H. G. Burd, Leslie E. Delf, Ralph W. Eaton, D. D. Ewing, L. F. Griffith, C. L. Hancock, H. D. Hawks, C. J. Hixson, Adrian Hughes, Jr., Charles H. Jones, John Leisenring, F. McVittie, H. S. Murphy, H. A. Pharo, W. Schaake, A. Schlesinger, James Scott, F. J. White, Charles R. Harte, sponsor, and M. B. Rosevear, chairman.

A written discussion of subject 1 by O. M. Jorstad of the Westinghouse Electric & Manufacturing Company was read by Mr. Rosevear. Several corrections in the printed report were called to the attention of the association, on pages 34, 35 and 51. These corrections were accepted by the convention and will be changed in the final report.

Subject No. 2 on trolley wire composition and wear was discussed by J. F. Neild of the Toronto Transportation Commission, who gave some results that have been accomplished in Toronto by following the recommendations contained in the committee's report. Mr. Neild said that the recommendations should be backed up by all operating companies and followed closely.

The subject of overhead construction for trackless trolley was discussed by J. F. Neild of the Toronto Transportation Commission, Adrian Hughes, Jr., superintendent of power, United Railways & Electric Company of Baltimore, Md., and H. S. Murphy, assistant electrical engineer Philadelphia Rapid Transit Company. Mr. Neild told of some of the difficulties they had in Toronto with overhead construction, while operating trackless trolleys, and changes that were made to overcome them. They use a 30-in. spacing of trolley wire and use standard line material in Toronto. He felt that subsequent committees should make recommendations for a standard spacing to be adopted by the association. Mr. Murphy said that they use a 24-in. spacing in Philadelphia and use standard line material. Mr. Hughes said they use a 24-in. spacing of trolley wires for trackless trolley operation in Baltimore and use standard line material. Both felt that a standard spacing was desirable.

C. R. Harte, construction engineer the Connecticut Company, gave an outline of the work which was being undertaken by the American Engineering Standards Committee on galvanizing and sherardizing and assured the members that this work was being considered very carefully.

The report of the committee on power distribution together with recommendations of the standards committee was received and approved by the association.

The report of the committee on power generation was abstracted in part by Chairman C. A. Greenidge, chief engineer, the J. G. White Management Corporation, New York, except the report of sub-committee No. 3, which was presented by L. D. Bale, superintendent substations, Cleveland Railway. An abstract of the report follows:

Power Generation

The first subject dealt with by the committee was recommendations regarding the A.S.M.E. boiler code. Tentative specifications of the A.S.T.M. for lap-welded and seamless steel and lap-welded iron boiler tubes were reviewed.

A second sub-committee reviewed recent progress in the design, application and operation of stokers, grates and furnaces. It is stated that this has been more an extension and refinement of previous developments than the application of any startlingly new principles. Demand has required improvements in the class of workmanship. Simplification and increased ruggedness of design through the entire redesign of some existing types have been found desirable in order better to meet those demands and the increased size of single units now desired.

The sub-committee on auxiliary equipment drive gave a brief comparison of electric and steam-driven auxiliaries. Coal and ash-handling and piping were considered by another sub-committee. The report on these subjects consists principally of a bibliography covering recent technical articles.

The greater part of the report is taken up with a review of current practice in automatic substation design and operation. This subject does not include the economic aspects of the automatic station, but is intended for the purpose of presenting an analysis of good current practices for the guidance of those who are interested in automatic substation operation.

Four general classifications were used in gathering and compiling data, as follows: Urban; steam railroad electrification; heavy duty interurban; suburban or interurban. Questionnaires were forwarded to electric railway systems operating 118 automatic substations. Answers to some forty-three questions were received from companies operating ninety-five automatic stations. These questions cover a wide range of design and operation.

A list of all companies operating automatic substations, together with the rating and type of service, is also included.

The sub-committee in presenting this report, much of which is in the form of tabulated statistics, states that it realizes that there are several very important phases of the subject that should be further investigated and given more prominence than was possible in the preparation of a report of this kind, which was only intended to cover the subject in general. Many of the individual aspects of the matter, which have been covered by the committee in this report, need not receive further consideration by engineering committees, at least until a further advance in the art is noted. There are, however, several questions, principal among which is the matter of ventilation, which should receive immediate attention. The committee recommended that the matter of automatic substation ventilation for plants in all classes of railway service be a subject for consideration by committees during the coming year.

The report was signed by L. D. Bale, W. E. Bryan, H. E. Davis, F. G. Frost, F. C. Hanker, G. H. Kelsay, H. A. Kidder, F. W. Peters, G. W. Saathoff, W. C. Slade, A. E. Stierly, R. L. Weber, G. W. Welsh, E. H. Scofield, sponsor, and C. A. Greenidge, chairman.

W. E. Bryan, superintendent of power United Railways of St. Louis, suggested that the report of sub-committee No. 3, recommending further study on the subject of ventilation, be given careful consideration and be included in the instructions to next year's committee.

The report of the committee on power generation was accepted. The report of the committee on standards, Martin Schreiber, chairman, which was acted upon in detail after the report of each committee during the convention was also accepted as a whole. In general the recommendations were approved, but in a few instances the standards committee did not agree. The standards which were disapproved by the standards committee follow:

Standards

Power Generation—A proposed definition of "generator output" was submitted for approval. The committee on standards voted that it would approve the definition only in the event that it had the approval of the American Institute of Electrical Engineers and similar organizations concerned with standard definitions of this character. It was further voted that there was no apparent need of this in a Manual section.

Wheel and Rail Contours—The committee passed the following resolution relative to the dimensions for steel wheels, Appendix B of the report:

"If the convention approves the new wheel contours (recommendation No. 1) this will necessarily involve the revision of certain existing tables of wheel dimensions in Manual section Et 7b as well as the revision of Manual sections Et 18a, Sm 3a and Ws 2a. The committee on standards desires at the same time to recommend to the executive committee that consideration be given to the possible expansion of the tables of dimensions (Manual section Et 7b) to permit obtaining standard flanges and treads in the standard diameters shown in Table 1."

Building and Structures—The committee on standards disapproved a recommendation that the report on prepayment and postpayment enclosures, with drawings 16 to 23 inclusive, be published in the Manual as miscellaneous methods and practices.

Way Matters — The committee on standards disapproved a recommendation that the title of Wr 1c be revised to read "plain girder and standard section rails," and suggested that the title read simply, "plain girder rails."

Equipment—Et 9b—Certain revisions to make this specification conform with A. S. T. M. specification, serial designation A-19-21 were referred back to the equipment committee to clarify an apparent conflict between proposed sections 301a and 301b.

Et 14b and Et 15b—Certain revisions were referred back to the committee on equipment for a reconsideration of proposed section 403a dealing with gear bores.

Et 22a—The proposal to omit section 111 dealing with permissible variations, since it is recommended that it be included in Manual section Et 3c, was disapproved, it being believed advisable to have this information in both specifications Et 3c and Et 22a.

B. J. Yungbluth, supervisor purchasing and supplies Philadelphia Rapid Transit Company, presented the report of the committee on purchases and stores which had been read on Wednesday to a session of purchasing agents and storekeepers for approval by the Engineering Association and inclusion in the Manual as recommended practice. This report was approved by the engineering association with the understanding that it would be submitted to the committee on standards for approval.

Purchases and Stores

Two subjects were assigned to this committee: (1) Review the classification of materials recommended in the Accountants-Engineering "joint report on stores accounting" and revise if necessary. (2) Continue the study of uniform method of taking periodical inventory with a view of the adoption of standard forms.

1. *Standard Classification of Materials and Supplies for Electric Railways*—A joint report was made on this subject by the committees on stores accounting and purchases and stores in 1921, but through a misunderstanding it was not formally acted upon by the Engineering Association. This committee, in joint session with the stores accounting committee, gave this matter further consideration and agrees with the conclusions contained in the Accountants-Engineering joint report on stores accounting, 1921, that in view of the vast sums of money tied up in inventories it is necessary to have a classification to provide a uniform and economic method of controlling the investment and to secure the advantages of a logical, physical grouping of materials and supplies for proper ordering, storing, handling, distributing, inventorying and recording. Such a classification has nothing in common with that of operating expense accounts.

It was recommended, however, that a classification of materials and supplies containing seventy-four subdivisions [published with the report of the committee on stores accounting of the Accountants' Association] be substituted for the one recommended in the 1921 report, which contained fifty-nine subdivisions. The former has been in successful use for several years and has met the test of practicability, while the latter has not yet been adopted by any company. The classification with seventy-four subdivisions, it was concluded, was more comprehensive and would more nearly meet the necessities of the larger companies, while smaller companies not requiring such detail may abridge it by making a selection of the classes meeting their requirements or consolidate them.

A monthly statement showing the operation in materials and supplies according to this classification is again urgently recommended. The form submitted in the Accountants-Engineering joint report on stores accounting, 1921, showing the revised classification is sufficiently comprehensive to meet the necessities of any company; although some companies will not require the information in such detail, they can readily consolidate certain columns and eliminate others in accordance with their necessities.

2. *Stock Books*—Before the committee could reasonably consider a method for taking fiscal inventories it was necessary to determine the basic system for stock control. The Accountants-Engineering joint report on stores accounting, 1921, recommended for the control of materials and supplies the stock book system either in lieu of the more customary form of stock card or stock ledger sheet, or in addition thereto and in conjunction therewith.

3. *Fiscal Inventories*—The purchases and stores and stores accounting committees in joint session unanimously approved the following recommendations for taking fiscal inventories of materials and supplies:

1. A general fiscal inventory of materials and supplies as designated by the accounting department for each property shall be taken annually as of one date; the date shall be agreed upon by the accounting department and the stores department.

2. The fiscal inventory shall be taken by the stores department in conjunction with and under the supervision of the accounting department, to assure its being satisfactory for fiscal purposes.

3. The quantities on hand at the time of the annual inventory shall be entered in the stock books in the "On Hand" column for the current month.

4. The form in which the list of material on the inventory will be supplied to the accounting department, and the method of pricing and extending the inventory will depend upon the practice of the various individual companies, as in some cases the accounting is done by the stores department and in others by the accounting department.

4. *Comparative Ratios — Investment in Materials and Supplies on Hand to Gross Earnings* — Realizing that the stock of materials and supplies on hand involves such a large investment, the committee sought to determine a gage by which to measure the performance of the various companies.

The ratio of materials and supplies on hand at the end of the year to gross earnings for the year was taken as a most practicable base for a comparison.

Questionnaires were sent to twenty-four companies for such information for the years 1920, 1921 and 1922; replies were received from thirteen, which show that all companies made successive reductions in the ratio for each year, and that each company maintained about the same relative rank. Taking the year 1922, the four companies having the lowest ratio show an average of 3.08; the second group of four companies showing the next lowest ratio averaged 5.64; the remaining five companies show an average of 7.34; while the ratio of all companies averaged 5.35.

5. *Sessions for Purchasing Agents and Storekeepers*—The committee recommended that such a session be held at the annual conventions.

6. *Subjects for Next Year*—The following subjects are recommended for consideration by the purchases and stores committee for the year 1924:

Method of classification and sale of scrap materials to increase the revenue therefrom.

The proper place for the purchasing and stores departments in the company's organization.

The report was signed by William C. Bell, Jackson P. Dick, J. F. Fleming, Walter N. Ford, C. A. Harris, Harry H. Lloyd, W. S. Stackpole, W. H. Staub, and B. J. Yungbluth, chairman.

Resolutions

C. R. Harte, in the absence of H. H. Norris, read the report of the committee on resolutions, which was accepted. The resolutions follow in part:

"Our officers, through painstaking and untiring effort, have laid the foundation which has made possible the successful outcome of this convention.

"The remarks of President Emmons to the effect that it is the duty of railway men to furnish the transportation facilities that the people need, indicate the wisdom of a farsighted policy in the matter of bus operation. The excellence of the bus exhibits and the evident interest therein have vindicated the policy of encouraging the manufacturers to adapt their equipment to mass transportation needs.

"The reports of committees were distributed well in advance of the meeting, giving opportunity for study prior thereto. This resulted in pointed discussion of the salient features of the reports.

"The sponsor system is to be credited with a considerable share of the success of this meeting, as it has provided a means for the officers to keep in close touch with the progress of committee effort.

"The increasing tendency to cooperate with other associations, particularly along lines of research, is commendable.

"The increasing interest in the standing committee on purchases and stores shows the wisdom of the establishment of this committee under the auspices of the Engineering Association.

"The exhibits have been well worked out with a view to showing the progress which has been made since the last exhibits of two years ago."

The report was signed by R. C. Cram, C. R. Harte and H. H. Norris, chairman.

The committee on nomination submitted the following names for officers and members of the executive committee during the ensuing year and these men were elected by unanimous vote:

President, H. A. Johnson, assistant to the general manager Metropolitan West Side Elevated Railway, Chicago.

First vice-president, C. H. Clark, engineer maintenance of way Cleveland Railway.

Second vice-president, R. C. Cram, engineer surface roadway Brooklyn-Manhattan Transit Corporation.

Third vice-president, Charles R. Harte, construction engineer the Connecticut Company, New Haven, Conn.

Executive committee: Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa.; R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.; E. H. Schofield, engineer power and equipment, Twin City Rapid Transit Company, Minneapolis, Minn.; M. B. Rosevear, superintendent of distribution Public Service Railway, Newark, N. J.

H. H. Adams and Martin Schreiber, past-presidents of the association, were named by retiring President Datz as a committee to escort the newly-elected officers and members of the executive committee for their installation. Before speaking of the newly-elected officers, Mr. Adams called attention to the creditable results accomplished during the past year under the leadership of President Datz. In presenting H. A. Johnson, the new president, he expressed confidence in the latter's ability to carry on the high standard of work set during the last year.

Mr. Johnson, in expressing his appreciation of the honor bestowed upon him by the association, called attention to the necessity for continued cooperation by the entire membership. He then presented the past-president's badge to Mr. Datz.

Each of the officers and members of the executive committee pledged himself to support actively the program for the ensuing year.

Mr. Harte called attention to the importance of closely studying the field for bus operation. No expressed confidence in the ability of the railway to carry on most efficiently mass transportation, but stated that the bus and car should be combined wherever necessary to give the best transportation.

James Dalrymple, general manager Glasgow Corporation Tramways, Glasgow, Scotland, addressed the association, outlining briefly the practice of his company. He also called attention to the serious unemployment situation which now exists in Glasgow.

Retiring President Datz moved a vote of thanks to Secretary J. W. Welsh and Special Engineer Guy C. Hecker for the effective work which they have carried out during the past year. He also moved a vote of thanks to the manufacturers for the splendid exhibits. Both were unanimously adopted.

New Officers of the Claims Association

The officers elected at the session of Oct. 10 to head the Claims Association for the ensuing year are as follows:

President, W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. J.

First vice-president, H. D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J.

Second vice-president, J. H. Handlon, claim agent Market Street Railway, San Francisco, Cal.

Third vice-president, C. B. Proctor, claim agent Memphis Railway and Memphis Power Company.

The executive committee consists of the officers and S. J. Herrell, claim agent Knoxville Power & Light Company; J. S. Kubu, assistant superintendent accident department Cleveland Railway; L. F. Wynne, general claim agent Georgia Railway & Power Company, Atlanta.

Convention secretary, E. L. Lindemuth, claim agent Wilkes-Barre Railway.

Card Parties and Dances Feature the Entertainment Program

AFTER the business of the day was done for the delegates, excellent entertainment was furnished in the evenings. On Sunday a delightful sacred concert was given before a large audience at the Marlborough-Blenheim, and on the following evenings there were dances, a carnival, and a swimming exhibition. During the daytime there were card parties for the ladies and a golf tournament.

Shortly after nine o'clock Monday evening the orchestra on the Pier broke into the strains of the "Star Spangled Banner," and at the conclusion, swung into a lively dance tune for the opening ball. Led by President and Mrs. Emmons, the crowd poured out onto the dance floor and the festivities began. The music was furnished by Paul Whiteman's Orchestra from New York and was much enjoyed by everyone present. At midnight the formal dancing at the Pier ended, but many of the dancers proceeded to the Hotel Traymore, where dancing continued until 2 o'clock.

The carnival on Tuesday evening was a huge success. Due to the careful preparations made by E. F. Wickwire of the Ohio Brass Company, there was something doing every minute. Professional and amateur entertainment was furnished, and in between these features there was general dancing. The regular lighting arrangements on the Pier had been supplanted by special lights installed expressly for the occasion by L. W. Mackall of the Crouse-Hinds Company, making the appearance of the Pier one of rare beauty. Fancy paper hats were furnished the guests as they entered the hall, and together with the gay costumes of the performers in the carnival, lent color to the scene.

More than a hundred of the ladies enjoyed a card party at Haddon Hall on Tuesday afternoon, which was more than double the number that have played at previous conventions. On Wednesday the ladies again played cards, this time at the Traymore.

The golf tournament was held on Sunday at the Northfield Country Club. As told in the CONVENTION DAILY, the attendance was as large as the scores were low.

Altogether, the entertainment committee, by providing amusement for every occasion, earned the thanks of all the delegates attending the convention.

The News of the Industry

I. C. C. Denies Application

Decision Says Western Pacific Seeks Sacramento Northern Lines for System Purposes

The Interstate Commerce Commission handed down a decision recently denying the application of the Western Pacific Railroad, a steam property, to acquire control of the Sacramento Northern Railway and to purchase the bonds of the Sacramento Northern Railroad. A similar application was denied by the commission on May 18, 1922, on the ground that the Sacramento Northern Railway was required to apply to the commission for authority to issue its stock and assume certain obligations and liabilities with respect to the securities of the Sacramento Northern Railroad. After the applicant had applied for a rehearing, which was held on Aug. 24, the case was orally argued before the commission on Dec. 6, 1922. It was the former record, supplemented by additional evidence, which the commission considered before handing down its latest findings. The matter was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 23, 1922.

The Sacramento Northern lines are now owned and operated by the Sacramento Northern Railroad. It was proposed that this company sell all of its property to the Sacramento Northern Railway, subject to existing indebtedness, including $5,224,373 principal amount of bonds of the old company, payment on which will be assumed by the new. The new company intended to provide itself with funds to complete the purchase, and with an additional amount of working capital, through the issue and sale, at par, of $1,000,000 of its capital stock.

The Western Pacific Railroad took the attitude that the Sacramento Northern Railroad was an interurban electric railway and that the Sacramento Northern Railway would have the same status. It was the plea of that company that neither the railroad nor the railway was subject to the jurisdiction of the commission and that the denial of the application on the part of the commission was wrong.

The commission says that even if it is allowed that the commission is without jurisdiction over corporations organized for the purpose of operating independently as interurban electric railways, the new Sacramento Company does not fall within the "except a street, suburban or interurban electric railway which is not operated as a part of a general steam railroad system of transportation."

The commission says further that there are signs that such operations will be of a broader character than those ordinarily performed by an "interurban electric railway." The Interstate Commerce Commission in its findings then lists seven indications which point to a character of business being conducted by the company more comprehensive than that ordinarily performed by an interurban electric railway.

On the other hand, the Western Pacific Railroad advanced seven arguments to show that the company would be operated as an electric interurban railway. The commission said that there was a basis for the conclusion that the carrier was more than an interurban electric railway if in addition to the business of this character it performed functions which are not commonly interurban functions and, further, was empowered by its charter to engage in transportation generally. The commission says that even if it were able to find that the new company will be operated as a "street, suburban or interurban electric railway," there would still remain the question whether or not it would be operated "as a part of a general steam railroad system of transportation."

The commission could not escape the conclusion that the Sacramento Northern would be operated as part of the Western Pacific system. Further, the commission said that other statements made by the Western Pacific all went to prove that the proposed acquisition was for system purposes, and that the lines, if acquired, would thereafter be operated as part of the Western Pacific System, which is a general steam railroad system of transportation.

For these reasons the commission said that the new company would have to apply to it for authority to issue its stock and assume the proposed obligations with respect to the securities of the old company, and until such application was made, the commission would be unable to pass upon the merits of the proposed acquisition of control. The findings, in the original report, were therefore affirmed.

Time Extended.—An extension of two weeks has been granted by the Supreme Court to the Schenectady Railway in which to file its answering brief in the case instituted by the Public Service Commission in which the commission seeks to collect penalty for alleged violation of an order issued April 7 requiring the company to install increased equipment facilities, following investigation of crippled car service.

Another Co-operative Association in Prospect

At a recent meeting at Baton Rouge of the Louisiana and Mississippi Committee of Public Utilities Information it was decided to organize a state association along the lines of similar co-operative associations in other states. The purpose of the association will be to insure unity of action in all matters of legislation affecting the interests of the Louisiana association and other matters which will make for the advancement and welfare of the state public utilities. W. J. Aicklen, general manager of the Consumers' Light & Power Company of New Orleans, a subsidiary of the New Orleans Public Service, Inc., was elected chairman of the movement.

Personal letters outlining the motives of the proposed association have been addressed by Mr. Aicklen to the several utility corporations of the state. No unfavorable replies have been received so far. When a sufficient number of responses are in hand to warrant it, a meeting of the public utilities interested will be called and formal action taken to place the association on an enduring footing. Articles of incorporation will be filed. Subsequently a similar association will be formed of the public utilities of Mississippi.

Wage Negotiations in Progress in Springfield

Negotiations for a new wage contract are now in progress between the Springfield Street Railway, Springfield, Ohio, and its platform men, the old contract expiring Oct. 1. Both sides express belief that the new contract will be amicably negotiated. The employees are demanding a rate of 46, 48 and 50 cents an hour, the amount depending on the length of service with the company. The present scale is 42, 44 and 46 cents an hour. The company submitted a compromise proposal Oct. 5, offering 44, 46 and 48 cents an hour, retroactive to Oct. 1, but at a meeting of employees held on the same date the offer was rejected, although it was said that representatives of the union conducting the negotiations favored its acceptance.

The first move made by the company after the employees submitted their demands was to throw the company's books open to a committee of workers to show them the present status of the company's finances. It was said to be the result of this examination that the committee recommended acceptance of the company's offer.

No change in working conditions is proposed by either side.

Financial and Corporate

Will Lift Receivership

Plans Being Made for Reorganization of the Birmingham Railway—$1,000,000 for Improvements

Plans are being perfected for lifting the Birmingham Railway, Light & Power Company, Birmingham, Ala., out of receivership and for the reorganization of the company. It is also proposed to spend more than $1,000,000 in the betterment and improvement of the street car service.

Arrangements have been made to take up the company's $4,601,000 of 6 per cent bonds at par and interest. The receivers have just contracted for new cars and other improvements to the amount of $600,000, according to the agreement between the company and the city commissioners, and also hope to spend an additional $100,000 for extensions and betterments.

Lee C. Bradley and J. S. Pevear, co-receivers, filed a petition Oct. 6 in the United States Court in Birmingham for authority to default in the payment of the interest on the 6 per cent bonds due Nov. 1.

SALE WILL INVOLVE NO EXPENSE

At the time of the filing of this petition announcement was made that a committee for the 6 per cent bondholders had been organized and had called for deposit of the bonds on or before Oct. 30. The committee announced that it holds a contract to sell the bonds deposited with the committee on or before May 1, 1924, if the principal of the bonds is due, at a price to yield to those who deposit their bonds the entire principal amount of the bonds and the interest from May 1, 1923, to the date of purchase, provided not less than 60 per cent of the outstanding 6 per cent bonds are deposited with the committee. If this sale is made it will involve no expense upon the depositing bondholders, members of the committee point out.

These bonds may be deposited with the Central Union Trust Company of New York, 80 Broadway, New York City, or with any of its agents, which will issue deposit receipts for all bonds deposited.

The petition of the receivers will be heard Oct. 30, before Judge W. I. Grubb of the United States Court of the northern division of Alabama. The petition filed shows about $1,975,000 of maturing company and receivership obligations due between Sept. 1, 1923, and July 2, 1924; $600,000 contracted to be spent as a direct result of the agreement with the city; $110,000 proposed to be spent in addition, as a result of the city agreement, and about $1,075,000 proposed to be spent during this period for improvements of the property. This shows that approximately $3,650,000 must be spent by the company in order that satisfactory service may be rendered. It is estimated by the receivers of the company that this program carried out through to July 2, 1924, will require almost $1,000,000 more cash than that expected to be available in this period of time.

It is proposed by the receivers to meet this deficiency by default on the 6 per cent bond interest due Nov. 1, 1923, and extension of other obligations, if such extensions can be arranged, but it is pointed out if the deficiency is not met by the extension of other obligations, the receivership might continue indefinitely. It is also stated in the petition that if a default is made and the 6 per cent bonds are made payable in full, they are advised that prompt steps will be taken to reorganize the properties and that the payment of the 6 per cent bonds will make this possible. But such default would in no way affect the company's underlying bonds, which will become due July 2, 1924, or the company's 4½ per cent bonds, of which there are now outstanding in the hands of the public $8,720,000.

The receivers say that in no event should there be a default in the 4½ per cent bonds, as that would require in the reorganization the raising of $8,720,000 cash with which to pay these bonds off in full, and probably cause the payment of a much higher rate of interest on the 4½ per cent bonds in the future.

It is believed that the company will be reorganized without delay, as details of the plans of reorganization are now being worked out.

Will Determine Fare in Duluth

In the Duluth fare case recently completed in the United States District Court of Minnesota, A. L. Drum of A. L. Drum & Company, consulting and constructing engineers of Chicago and Philadelphia, testified before Hon. Thomas D. O'Brien, special master, on the value of the property of the Duluth division of the Duluth Street Railway in a hearing at Duluth.

Mr. Drum presented valuations of the property as of July 1, 1921. He summarized the physical property, including power contract, as follows: Present-day cost, prices current June, 1921, $8,599,526; ten-year average cost, average prices 1912-1921, $6,853,120; pre-war cost, prices current year 1915, $5,207,626; estimated original cost, prices current date of installation, $5,206,267.

In addition Mr. Drum submitted a report on the developmental costs to the company, which amounted to $1,129,826, based on estimated original cost, which represents the costs that have been, or would be, encountered in creating and developing the property to its present state of efficiency. Taking these costs into consideration and the present condition of the property, Mr. Drum testified that the going concern value of the Duluth division was at least $800,000. Considerable additional testimony was heard as to operating costs, increased service, schedules, etc.

As a result of this hearing the rate of fare to be established in the city of Duluth and the value of the property of the company will be determined.

Discontinuance of Northern Massachusetts Property to Be Discussed

Patrons and stockholders of the Northern Massachusetts Street Railway in the territory served by the Gardner, Westminster & Fitchburg division are interested in the announcement of the Gardner Chamber of Commerce that bondholders of the road are threatening to foreclose. The Chamber of Commerce has called a special meeting to discuss the subject.

In a bulletin which the Gardner chamber has issued it is noted that I. M. Garfield, of the law firm of Garfield, Whiteside & Lamson of Boston, presents what is termed "the only concrete suggestion which comes from official source."

The letter from the attorneys representing the railway bondholders points clearly and specifically to the junking of the line unless local interests help in the crisis. It is said that if Gardner men and the citizens of the other towns which the road serves would agree to assistance there is likelihood that a reorganization of the Gardner, Westminster & Fitchburg branch would be arranged, thus permitting its continuance.

The bonds of this division can be bought at a reasonable figure, the letter says.

Gardner people have not warmed up to the suggestion and Mayor Chester P. Pearson of that city has expressed the opinion he is satisfied to have the line junked if it be the wish of those interested in the property.

"Ten years ago if the railway had been discontinued it would have been somewhat of a calamity but now Gardner's roads would be much better if the rails of the company were taken up," Mayor Pearson said.

The Mayor says he feels if the bondholders foreclose and some other interests take over the line a portion of the road could be run at a profit. The Mayor's suggestion is that a line from the Greenwood shop in South Gardner to Templeton could be run to the advantage of many patrons.

However, there are members of the Gardner City Council who feel discontinuance of the railway would be the loss of a modern and indispensable facility.

Templeton residents are disturbed at

the possibility of the discontinuance for it would leave them without access to Gardner or other nearby places.

Some time ago in answer to a letter from Receiver W. P. Abercrombie of the railway the Gardner City Council expressed a willingness to consider a plan designed by that official for the operation of motor buses in the section, but nothing has come of this. There has been no action on the suggestion also made some time ago by attorneys for the bondholders for consideration by the City Council of a proposed plan for reorganization.

Receiver Refused for Dayton, Springfield & Xenia Southern

Motor bus competition during last year was responsible for the failure of the Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, to pay the interest on $396,000 in bonds during the last six months. United States District Judge Smith Hickenlooper was informed of this condition by Province M. Pogue and Judge Harry M. Hoffheimer, attorneys representing the company, when Frank Dinsmore and Judge Walter Shohl, Cincinnati, representing the First Wisconsin Trust Company, Milwaukee, trustee of the mortgage under which the bonds are secured, sought the appointment of A. H. Effner, former general manager of the Cincinnati, Georgetown & Portsmouth Railway as receiver of the lines and properties of the Dayton, Springfield & Xenia company.

Judge Hickenlooper, after hearing the arguments of counsel on both sides on the motion of the Wisconsin company for appointment of a receiver to take charge of the company, declined to make an appointment at this time and intimated that in his opinion the appointment of a receiver would not be to the best interest of the parties concerned. The court intimated also that from the evidence it had gathered there is a family controversy involved in this case and that unless it is shown that the company is insolvent it will not be disposed to grant the motion for a receiver.

The bill of complaint of the Wisconsin Trust Company was filed in the Dayton Federal court, Oct. 2. In the bill, it is said, it was alleged that the defendant company had defaulted interest due on outstanding bonds of a bond issue of $500,000 secured by mortgage to the Wisconsin company and that to protect the interests of bondholders the mortgage should be ordered foreclosed and a receiver appointed forthwith to take charge of the properties of the defendant company.

It was on the motion for the appointment of the receiver that the case came for hearing before Judge Hickenlooper, Oct. 6. The company, through its counsel contended that if a receiver were appointed it should be T. A. Ferneding of Dayton, vice-president and general manager of the company, whose administration of the defendant company's affairs had been all that could be expected, it was stated. It was declared that Mr. Ferneding is one of the principal owners of the bonds secured by mortgage to the complainant trust company and that his record as general manager has been such as would entitle him to the full confidence of the court in the event the court should see fit to appoint a receiver.

In his statement to the court showing the loss of revenue of the defendant company through motor bus competition, Attorney Pogue stated that the company lost 71,000 passengers last year. Mr. Pogue declared emphatically that the company is not insolvent and that there is no reason for the appointment of a receiver at this time.

Indications Point to Insufficient Return in New Orleans

R. S. Hecht, chairman of the board of directors of the New Orleans Public Service, Inc., in making announcement that the books of the company for the last quarter of 1923 had just been closed, declared that, in the absence of detailed figures, the indications seemed to be that the earnings of the company have been insufficient to make a rate of return of 7½ per cent on the allowed valuation under the company's reorganization agreement, though the earnings justify the rate of return on the company's bonded indebtedness of $42,000,000.

Mr. Hecht does not anticipate that the company will make application for higher rates because of its failure to carry out successfully its compromise agreement; on the contrary, he is of opinion that when the public utilities have been thoroughly rehabiliated, which they were not during the best part of the trial year, the rate return of 7½ per cent will yet be earned on an even lower scale of rates for gas and car fares.

Large sums had to be raised to bring the public utilities to the desired standard of efficiency, so that their affairs could be economically administered; but with a new power unit recently installed and a large addition of street cars, of greater seating capacity, all of which were lacking when the trial test was started, a further test under present rates may be advisable, to learn definitely whether greater operating economies will not make it possible to earn the 7½ per cent return. The detailed figures will not be available for two or three weeks, Mr. Hecht said, when it is purposed to go over the entire year's operation with Commissioner Paul H. Maloney of the Department of Public Utilities.

Auction Sales in New York.—At the public auction rooms in New York on Oct. 10 there were sold fifty shares of West Virginia Traction & Electric Company preferred, $50 lot, and three shares of Toledo Traction, Light & Power Company 6 per cent cumulative preferred, $82 per share.

Foreclosure Suits Filed

Mortgage Bonds of $30,000,000 Matured Oct. 1—Interest Centers on United Railways' Suburban Properties

The first of two threatened suits to foreclose on property of the United Railways, St. Louis, was filed in the United States District Court in St. Louis on Oct. 2 in behalf of a Colorado holder of $4,000 of the general mortgage 4 per cent bonds of the company which fell due Oct. 1.

The action was brought by Ephraim Caplan, who filed the original suits for the receivership against the company several years ago. The suit names the United Railways and Rolla Wells, receiver, as defendants, as well as the St. Louis Union Trust Company, trustee under the mortgage securing the bonds. The total general mortgage bonds maturing Oct. 1 was $30,000,000. They were issued in September, 1899.

Foreclosure on the property of the St. Louis & Suburban Railway part of the United Railways system is planned by Samuel B. Jeffries, representing a committee of the bondholders. This action was decided upon some time ago. On Sept. 29 the Suburban bondholders were successful in their efforts to have Federal District Judge Faris deny the application of Receiver Rolla Wells for permission to extend the time for payment of the three underlying bond issues aggregating $4,100,000 due on Oct. 1.

The foreclosure suit contemplated by Mr. Jeffries would bring about the sale of the Suburban property and a separation of the merged systems. There are $4,500,000 general mortgage suburban bonds outstanding. These bonds expired on April 1 but the time for payment was extended to Oct. 1. Demand for payment on that date was made on Receiver Rolla Wells several days ago.

OUTSIDE INTERESTS WANT SUBURBAN CONTROL

Powerful outside interests are said to be anxious to get control of the Suburban property, which includes the Hodiamont, Sarah, Union, Manchester and the Kirkwood-Ferguson lines. In this connection the Studebaker-McKinley interests have been mentioned. It is said that should this group take over the Suburban lines they would be merged with the McKinley Traction System, which now enters St. Louis, and form the nucleus for a St. Louis-Kansas City interurban line. This system would also have connections with Danville, Peoria, Springfield and other important points in Illinois, and possibly within a very short time a line into Chicago.

Part of the plans for a reorganization of the Suburban is an elevated system along the right-of-way of the Hodiamont line, which has a private right-of-way between Vandeventer and Morgan streets and the old Suburban Garden in Wellston. This would give St. Louis rapid transit, something for which the city is sadly in need.

Traffic and Transportation

Birmingham Railway Starts Bus Operation

As a result of the abolishment of the jitneys in Birmingham, Ala., the Birmingham Railway, Light & Power Company is planning the installation of a number of motor bus lines to run to sections of the city not reached by the street cars at the present time.

One of these bus lines went into service Oct. 6 and is being operated successfully from Birmingham to Tiddlesville, a suburb lying several miles out. Another line will be established soon operating from the city of Birmingham to the suburb of Milner Heights.

Permits for the operation of these bus lines were issued by the city commissioners of Birmingham, Oct. 6. Under a new city ordinance each one of the buses operated by the company is required to make a bond of $10,000. Bonds for the two bus lines named are already made. Arrangements are made on these bus lines for the separate accommodation of both whites and negroes.

All bus lines established by the company will connect with car lines of the company, and transfers will be issued for both the cars and the buses for the additional sum of 2 cents, the same as is charged for a transfer from one car line to another.

Dispute Over Terminal Site

The permit of the Orleans-Kenner line to use North Rampart Street between Canal and Tulane Avenue as a terminal having long since expired, the Commission Council of New Orleans, upon completion of the reorganization of the New Orleans Railway & Light Company, served notice upon the company that it would have to vacate the street that it had been using without authority as a terminal. This is one of the most heavily congested thoroughfares in the city. It is traversed by several electric railway lines and on it is located the present terminus of the Spanish Fort Railway, which operates between the city and summer resorts along Lake Pontchartrain.

The Commission Council selected a site for the Orleans-Kenner line on Howard Street. This arrangement brought on a storm of protest from the people of Jefferson Parish, the other terminal of the road, as well as objection from the members of the police jury of the parish. The site selected was objected to on the grounds that it was too far away from the shopping district and would work a hardship upon the people of Jefferson Parish, contiguous to New Orleans, who made most of their purchases in this city. At a conference held recently with Commissioners Maloney and Ray of the Departments of Public Utilities and Public Safety and representatives of the Orleans-Kenner road, the New Orleans Public Service, Inc., and the police jury of Jefferson Parish, a site on South Liberty Street between Tulane Avenue and Canal Street, only a short distance away from its present terminal, was tentatively agreed to by all parties to the conference and the incident was presumed to be closed.

It now develops that the residents of South Liberty Street, at the point selected for the new terminus of the Orleans-Kenner Railway, object to the agreement reached and have suggested in its stead that the terminal be placed in the rear of the Elks' Home. It is barely possible that the Orleans-Kenner Railway may be compelled to stop operation at the Orleans Parish boundary line and issue transfers good from that point into New Orleans over the lines of the Public Service, Inc.

The South Liberty Street protestants will be heard by the Commission Council.

Freight Service at Night North from Indianapolis

Improved interurban freight service in northern Indiana territory has been arranged by the Union Traction Company of Indiana. The new service will enable Indianapolis wholesalers and business firms to compete more advantageously with Chicago firms. H. A. Nicholl, general manager of the railway, has notified John B. Reynolds, general secretary of the Chamber of Commerce, that a new freight car, the "Cannon Ball Freight," will leave Indianapolis every night at 11 o'clock, arriving in South Bend, Ind., the next morning at 8 o'clock.

The new freight schedule will enable Indianapolis wholesalers to receive and load shipments the same day and deliver goods in South Bend and Chicago territory the next morning. This will give the local dealers a decided advantage over Chicago shippers, it is pointed out.

Efforts have been made to obtain improved interurban freight facilities to the territory about South Bend.

Temporary Permits No Longer Good.—The New Jersey Public Utility Commission issued an order on Oct. 5 directing all buses operating parallel to trolley lines on temporary permits issued by municipalities to withdraw at once. If any drivers disobey the order, the commission will request William L. Dill, Motor Vehicle Commissioner, to revoke their operators' and registration licenses. This action came after a hearing at the headquarters in Newark of the utilities body. Harry V. Osborne, president of the board, announced that Commissioner Dill had agreed to co-operate in carrying out the order.

Court Approves Jitneys in Columbia

"Jitney" drivers in Columbia, S. C., have scored two victories in the courts during the past few days, and as a consequence the competition which the Columbia Railway, Gas & Electric Company is meeting with will likely be redoubled. Recently the South Carolina Supreme Court held that the city ordinance prohibiting the operation of motor vehicles for hire on certain sections of Main Street, save under restricted conditions, was null and void. The ordinance, the court interprets, is an attempt to legislate the "jitneys" out of existence. The case originated in the City Recorder's Court, where a jitney driver was tried and convicted of violating the ordinance. The case was then appealed to an associate justice of the Supreme Court, who decided that the ordinance was null and void.

The other victory for the jitney drivers was won in the Court of Common Pleas. At a recent session of the Legislature the South Carolina Railroad Commission was given authority to supervise and regulate the operation of "public" utilities. Under this clause the railroad commission undertook to regulate the operation of motor vehicles for hire, and for the protection of passengers required the vehicles to be bonded. Some drivers arranged for the bond and others continued to operate without the bond. The commission then sought an injunction requiring the drivers to show cause why they should not be enjoined from further operating the jitneys until they had complied with the requirements. The case was argued and the judge refused the petition for an injunction, holding that "public utilities" were limited to concerns furnishing gas, electricity, heat, etc. This case, however, will be taken to the Supreme Court.

Changes in Night Service on Boston Elevated

All night service into the Tremont Street subway in Boston will be instituted Oct. 14, it has been announced by the Boston Elevated. Night car service now operated to Adams Square will run into Tremont Street. Cars will run on present schedules, using the subway instead of surface lines. Shuttle service will be operated in the Tremont Street subway connecting the lines which run to Park Street with those that run to Brattle Street. Transfer privileges will remain as at present. The keeping open of the Tremont Street subway through the night is only one of the several requests for changes in the night service that could be granted. The continuance of the 5-cent fare service from 12 a.m. to 5 a.m., the Elevated officials say, is out of the question, owing to the light traffic and consequent lengthening of routes during that period. The officials also state that a 5-cent service over one line for the benefit of a special class of patrons would constitute unjust discrimination.

Interurban's Interstate Rates Not Unreasonable

Rates on commodities in carloads from local stations on the line of the Boise Valley Traction Company, Idaho, to interstate destinations, have been found by the Interstate Commerce Commission not to be unreasonable or unduly prejudicial.

The rates were attacked by shippers on the ground that they are unduly prejudicial to the local points on the traction line. The commodity rates are made by a combination of the traction line's local rates to the junction point and the steam carriers' rates beyond. The electric line, including branches and side track, is 80 miles in length. It extends from Boise along the north bank of the Boise River to Middleton. There it connects with the Oregon Short Line Railroad's Idaho Northern branch. It then crosses the river and connects with the main line of the Oregon Short Line at Meridian. The traction line owns little freight equipment. It interchanges only three of its box cars with the Short Line and those are used in switching service only. It depends upon the Short Line for equipment used in interstate shipments.

In its decision in the case, the commission, among other things, says:

> The financial condition of the traction line is unfavorable. During 1921 it failed to earn operating expenses and interest on its funded debt by more than $54,000. Its general manager testified that its rates were established on a low basis due to the fact that the blanket rates did not apply to or from points local to its line.

Commissioner Campbell, in a dissenting opinion, holds that the shippers on the electric line are being subjected to prejudice because the Short Line fails to grant them the same rates as are granted to shippers on other short and branch lines. He said:

> The situation disclosed by the record in this case indicates that the complaining shippers are laboring under a great disadvantage and I cannot sanction the action of the majority in depriving the shippers of the relief they seek and to which I believe they are entitled.

James F. Hamilton a Model for Employees

The successful career of James F. Hamilton, who in twenty-one years rose from conductor to the presidency of the New York State Railways, is cited in a message to the platform men of the Rochester lines of the system by Charles R. Barnes, City Commissioner of Railways, in a recent issue of the employees' magazine. In this message the commissioner points to the rapid climb of the railway executive as an example. That courtesy is an important factor in success in the traction field is stressed by Mr. Barnes.

His appeal says in part:

> You are engaged in a legitimate occupation. Your uniform should be as highly respected as any other in the city. It is up to you men to maintain such a condition. This can be done by furnishing proper service to the people, which, as far as you are concerned, consists in polite and courteous treatment—in so far as possible, having your trains on time, stopping to receive and discharge passengers, when or where as provided for by the rules, keeping your cars neat and tidy, and paying special attention to your personal appearance.
>
> Presidents of railway companies are not born; they are made. The president of your company is an illustration of that statement. He rose to his present position by strict attention to his business along the lines I have suggested.

Bus Franchise Deferred

Efforts of E. W. Hicks of Worcester, Mass., to establish a jitney service between Clinton and Sterling and Clinton to Worcester were unavailing when the Clinton Selectmen put off granting a franchise. Opposition to the establishment of the lines had previously developed from the Chamber of Commerce of the town, although it was not shown when the Selectmen considered the matter. It is said the chamber is not opposed to the Sterling and Clinton line, but has objections to any line that would compete with the Worcester Consolidated Street Railway between Clinton and Worcester. The Clinton Selectmen have not entirely discouraged any attempt by Mr. Hicks to get the franchise for they have notified him their action is simply held in abeyance to give any person or persons who cares to enter objection a chance to do so. Mr. Hicks has informed the Selectmen he has no intention of competing with the trolley lines. He is desirous of getting the Sterling to Clinton route approved, he says, to enable him to connect with the line he now operates between Worcester and Holden and Jefferson.

Authorizes Abandonment, Then Gives Bus Permit

The Public Service Commission has granted the request of the Elmira Water, Light & Railroad Company, Elmira, N. Y., to abandon a portion of its trolley line operating from Elmira to Horseheads and Watkins, on the ground that the line has not paid operating expenses for some years. At the same time the commission granted a certificate for the operation of a bus line as a substitute to supply the needed transportation facilities. The order permitting the abandonment provides that the company shall do so at its own expense and that during the time that the tracks remain, the company shall, at its own expense, keep in good repair that portion of the highways and paved streets that are now required to be kept in repair under the present statute.

The bus certificate is issued to Mr. Marshall and provides that "no local passengers shall be carried from one point to another on that part of the route between the terminal of the city of Elmira and the northerly boundary of the village of Horseheads." He is further directed to bring all buses to a dead stop when approaching railroad crossings, if any exist, and to exercise care in crossing the tracks. He is not to sell his certificate without the approval of the commission. Residents of the communities interested urged the granting of the certificate to Mr. Marshall in the event of the discontinuance of service by the trolley line.

No Reduction in Fare in Quincy

Charles G. Wadleigh, chairman of the public trustees of the Eastern Massachusetts Street Railway, has replied in the negative to the petition of Mayor Bates of Quincy that a 5-cent fare be established from the outlying sections of the city and a 3-cent additional charge for a transfer. The present rate is a 10-cent fare from all points at the edge of the city to the center, although the company sells a sixteen ride ticket for $1.

The petition presented by Mayor Bates was the result of an effort made by the workmen of the Fore River Shipbuilding Corporation, who claimed they were paying 40 cents a day to get to and from work, while still living in the precincts of the city of Quincy.

In answering Mayor Bates' request, Mr. Wadleigh said:

> In 1919 and 1920 the Quincy district failed by very large amounts to earn the cost of service. Up to about the middle of 1920, the non-profitable lines of Hingham and Weymouth were included in the Quincy district, but at that time they were set apart as separate districts, and Quincy relieved of the burden. Since 1920 the Quincy district has been fortunate in having but little burden from lines outside the city.
>
> In 1921 the district failed to earn the cost of service by $15,713. In 1922 it earned the cost of service by the narrow margin of $4,621. For the first seven months of 1923 the cost of service has been earned with a margin of only $1,799.
>
> In 1920 there was a 10-cent cash fare in Quincy, with a ticket rate of 8½ cents. Since that time the ticket rate has been lowered three times, as operating results warranted, until now the rate is 6¼ cents per ride. The last reduction in fare to the present rate was made only a little over four months ago, and, as is usual on every reduction in rate, has resulted in a reduction in earnings.
>
> It has been possible to keep the present ticket rate only by practicing the utmost economy and efficiency in operation.
>
> As you are undoubtedly aware, an arbitration board has just recently awarded the carmen in Quincy a substantial increase in wages, which is retroactive to May 2 of this year. This is an additional expense which must be met out of car fares, and it has been a serious question in our minds whether we would not be compelled to increase fares in order to get sufficient funds to pay it. We intend to make every effort to meet it without increasing fares.

Allows One-Man Cars for Interurban Service

The Railroad Commission has authorized one-man interurban service by the Eastern Wisconsin Electric Company on its Fond du Lac, Oshkosh, Neenah and Menasha interurban division. The commission in its decision allowing the company this service examined the financial figures, which showed that for the first six months of the year 1923 there was available from earnings for depreciation and return on investment for the electric railway system an amount equaling only 2.26 per cent of the value of the railway property used and useful for the public. In view of the competition to which the company is subjected by reason of steam railroad and motor bus transportation, it is doubtful if an increase in rates would result in a material increase in revenue. The commission believed that all economies in operation consistent with public safety and convenience should be adopted by the company.

Personal Items

Thomas V. Campbell Appointed Maintenance Superintendent

Thomas V. Campbell has been appointed superintendent of maintenance of the New York & Queens County Railway, Long Island City, N. Y., and started on his new duties Sept. 17.

Mr. Campbell began his railroading career in 1898 with the old Metropolitan Street Railway of New York and was with it for ten years, serving in various capacities from dynamo wiper to shop foreman. In 1908 he took charge of the equipment of the Yonkers Railroad. In 1911 he was appointed shop foreman of the New York City Interborough Railroad, which later became part of the Third Avenue Railway system. His next position was as shop foreman of the Smith Street division of the Coney Island & Brooklyn Railroad, which position he held until February, 1914, when he went with the Public Service Railway of New Jersey, remaining there three years and leaving to accept a position with the Submarine Boat Corporation in charge of the electrical installation on vessels that company was turning out during the war period. In March, 1921, Mr. Campbell became master mechanic of the Jersey Central Traction Company at Keyport, N. J.

Mr. Campbell's duties in his new position with the New York & Queens County Railway include the maintenance of the transmission and distribution system, as well as rolling stock and buildings.

George S. Brush with Motor Company

George S. Brush, for the last five years superintendent of transportation of the Houston Electric Company, has resigned to go to New York, where it is announced that he will become associated with a company manufacturing trucks.

Mr. Brush has been a prominent figure in the railway field since 1908, when he entered the employ of the Boston Elevated Railway in the transportation bureau. During vacation time, prior to this, he was employed by the Middlesex & Boston Street Railway, at Newtonville. Here he did original work in the direction of publicity for traffic stimulation. From the transportation bureau of the Boston Elevated, he was transferred to the president's office, later to the claims department, and in 1910 was appointed chief clerk of Division 6, with headquarters at Sullivan Square terminal, Charlestown. He later became chief clerk of Division 8, which comprised the entire business section of Boston and included all surface cars, subways and tunnels.

In December, 1915, Mr. Brush was appointed superintendent of the railway department of the Cumberland County Power & Light Company, in Portland. He left that position early in 1918 to become superintendent of transportation of the Springfield Street Railway, Springfield, Mass., succeeding F. V. Fabian. In the fall of 1918, Mr. Brush tendered his resignation as superintendent at Springfield and accepted the position of superintendent of the Houston company, a Stone & Webster property.

Mr. Brush was born in Stillwater, Minn., in 1884. He was educated at the Massachusetts Institute of Technology, taking the course in mechanical engineering. While he was engaged at Portland with the Cumberland County property, he was regarded as one of the best younger operating executives in New England electric railway circles.

Another Promotion for I. W. Pettengill

I. W. Pettengill, who recently was made secretary and general manager of the Cincinnati, Milford & Blanchester Traction Company, which promotion was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 15, has been elevated to the presidency of the interurban company. He succeeds J. P. Peurrung, who resigned after ten years service to engage in the match manufacturing business in Cincinnati. Before his affiliation with the interurban company, Mr. Pettengill was electrical engineer for the Cincinnati Screw Company, Loveland, Ohio.

Henry Kroger, a son of B. H. Kroger, owner of the Cincinnati, Milford & Blanchester Traction Company, has been made secretary and treasurer, while Chester Kroger, another son, has been made assistant secretary and treasurer. Under the previous arrangement Henry Kroger was treasurer and Chester a director of the interurban company. As president, Mr. Pettengill will be in active charge of operations.

H. D. Cowles Chief Inspector

E. M. Walker, president of the Schenectady Railway, has announced the appointment of H. D. Cowles, an electric railway man of twenty-three years' experience, to the new post of chief inspector. In future, all inspectors and motorman instructors will report to Mr. Cowles, who will have an office in the waiting room in State Street, Schenectady. Mr. Cowles has been associated with the company in Schenectady for the past four months.

From 1901 to 1907 he was a motorman on the Hudson Valley lines. For the next ten years he served the same company as train dispatcher and inspector. For three years beginning in 1917 he was assistant superintendent in Youngstown and since then has been with the New York State Railways in Rochester as chief inspector and then with the United Traction Company in Albany.

Ralph Peters Dead

Was One of the Biggest Figures in American Railroading—Transformed L. I. R.R. Into Great Trunk Line

The man who changed a summer excursion line to one of the greatest passenger railroads in the United States died suddenly on Oct. 9 at his home in Garden City. He was Ralph Peters, president of the Long Island Railroad for eighteen years. On Nov. 19 next, his seventieth birthday, he would have completed fifty years in the railroad business. The romance of railroading was probably born in him, as his father, Richard Peters, was one of the pioneer railroad builders of the South.

Ralph Peters

Ralph was born in Atlanta, Ga., and after graduation from the University of Georgia entered the employ of the Atlanta Street Railways, serving in the capacity of superintendent and purchasing agent for two years. Later he went to the Pennsylvania Railroad. From 1901 to 1905 he was general superintendent of the Southwest System of the Pennsylvania Lines West of Pittsburgh, with office at Columbus, Ohio. When in April, 1905, a vacancy occurred in the position of president and general manager of the Long Island he was selected for that office. Since that date he had been at the head of the Long Island System, as president and chief operating officer of the Long Island Railroad, New York & Rockaway Beach Railway, New York, Brooklyn & Manhattan Beach Railway, Montauk Steamboat Company, Ltd., and eighteen other subsidiary lines.

When the government took over the control of the railroads in 1918 Mr. Peters was selected as Federal manager of the Long Island System. He accepted the post and was relieved of his duties as president of the corporation until March 1, 1920, when the railroads were returned to their owners.

The growth of the Long Island Railroad is a monument to the untiring energy and extraordinary perseverance of Mr. Peters, who converted this line from an excursion line to one of the greatest trunk line railroads in the country.

One of Mr. Peters' greatest achievements was in the matter of electrification. Electric train service was started in 1905 between Flatbush Avenue terminal, Brooklyn, and Rockaway Park. Since that date electrification has been extended until now there are 227.2 miles of electrified track in operation on the Long Island System.

In 1905 the system carried 18,000,000 passengers and 2,745,000 tons of freight. In 1922 the road carried 79,656,891 passengers, while freight to the amount of 6,027,860 tons was hauled. More than $50,000,000 has been invested in improvements and equipment on the road since Mr. Peters assumed the presidency.

During his eighteen years as head of the Long Island he has done more than any single man or organization to promote and develop the agricultural resources of Long Island and was instrumental in bringing about the cultivation of tens of thousands of acres of hitherto idle and non-producing land on the island.

His was a policy of expansion and development. Although he lived to see many of his dreams of reconstruction and transformation come true, he still had a vision of the time when all the branches of the system would be electrified, and a four-track line from one end of the island to the other, and when Montauk Point, at the extreme eastern end of Long Island, would be a monumental port of entry for transatlantic steamers.

Although a busy executive in the railroad field, Mr. Peters cultivated other interests also. He was a member of the Society of the Sons of the Revolution and of the Colonial Wars Society and held membership in the Union League Club of New York and the Cherry Valley Golf Club of Garden City. He is survived by his wife, a son, Ralph, Jr., who is superintendent of transportation of the railroad, five daughters, a brother and a sister.

Lewis R. Schenck

Lewis R. Schenck, president of the Toledo & Indiana Railroad, Toledo, Ohio, died suddenly on Oct. 4 at his home in Toledo. For many years Mr. Schenck was connected with the J. G. White Engineering Company in New York City. When his father, S. C. Schenck, died he returned to Toledo and took up the management of the S. C. Schenck Coal Company and following the death of his brother he was elected head of the Toledo & Indiana line of which his father and brother had been president in turn. Mr. Schenck was born in Toledo, July 29, 1880. After he was graduated from the public schools he attended St. Paul Preparatory School in Concord, N. H., and later entered Yale from which university he was graduated in 1904.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

59,008 Surplus Cars on Sept. 22

The railroads of the country on Sept. 22 had 59,008 surplus freight cars in good repair and immediately available for service. This statement is in accord with reports filed by the carriers with the Car Service Division. On the same date the reported car shortage for the country as a whole was 13,515 cars. Compared with Sept. 14, the number of surplus freight cars on Sept. 22 represented a reduction of 10,072, while there was an increase of only 270 cars in the reported car shortage in the same period. The railroads reported on Sept. 15 that they had fewer freight cars in need of repair than at any time since may 15, 1920. The number in need of repair on Sept. 15 totaled 165,284, which represented a decrease of 10,043, compared with the number in need of repair on Sept. 1, at which time there were 175,327.

Anaconda Buys National Conduit & Cable Hastings Plant

The American Brass Company, an Anaconda Copper subsidiary, has purchased at receiver's sale the plant of the National Conduit & Cable Company for $3,000,000. Confirmation of this sale was made Oct. 4. The purchase price is the amount of bond issues standing against the property of National Conduit & Cable at Hastings-on-Hudson, N. Y., the bulk of which was bought up some time ago by Anaconda.

The rod and wire mill at Hastings, which is the property purchased, has a capacity of 10,000,000 lb. per month and is in good condition, requiring only minor changes to make it efficient.

This new purchase by the Anaconda organization fortifies those wire mills so located as to cater economically not only to domestic but to world demand. The Hastings plant is particularly well adapted to the exporting of copper rods and electric wires to continental Europe.

Second Power Show Scheduled

The 1923 Exposition of Power and Mechanical Engineering will be held in the Grand Central Palace, New York City, Dec. 3 to Dec. 8. The number, diversity and interest of the exhibits of the second exposition promise to excel those of the first exposition held in December, 1922. The exhibits will be supplemented by an extensive program of moving picture films to be presented in co-operation with manufacturers. Last year the picture program was found to interest the layman who was not informed about technical processes and the engineer whose close application to one field of his work had not enabled him to keep up with progress in the rest of the profession.

About two hundred exhibitors have signed contracts for space.

Chilean Railways to Obtain Block Signaling Materials from Union Switch

The electrification of the Chilean State Railways from Valparaiso, on the Pacific Ocean, to Santiago, the capital, located in the foothills of the Andes Mountains, is the most extensive trunk line electrification yet undertaken in South America. This railway, part of which is single and part double track, connects the metropolis of the west coast of South America with its most important seaport, traversing a mountain range having an elevation of 2,500 ft. The first regular electrically operated train was run over a portion of the line in July. It is anticipated that the installation will be completed and all trains electrically operated by Jan. 1.

Contract has been awarded the Union Switch & Signal Company for 515 Style R color light signals, 1,189 alternating-current relays, impedance bonds, check-locking circuit controllers, track and line transformers, pot signals, instrument housings, etc., for complete track circuit signaling between Valparaiso and Santiago, where the signals are semi-automatically controlled, and for the signaling of the Los Andes branch, where the control is manual. Check-locking using Union Switch Electrically locked circuit controllers, including complete track circuit control, will be installed on the single-track portion of the main line.

The construction work will be handled by the railway company's forces under the supervision of W. J. Evans, chief of the department of signals, telegraph and telephone, and P. Godoy, his assistant.

Metal, Coal and Material Prices

Metals—New York	Oct. 9, 1923
Copper, electrolytic, cents per lb.	13.00
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.85
Zinc, cents per lb.	6.61
Tin, Straits, cents per lb.	42.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.825
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons.	1.25
Central, Ill., screenings, Chicago, net tons	.70
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.98
White lead, in oil (100-lb. keg), N. Y., cents per lb.	11.375
Turpentine, (bbl. lots), N. Y., per gal.	$1.04

Rolling Stock

Jacksonville Traction Company, expects to buy four cars for use in South Jacksonville.

Kitchener & Waterloo Street Railway, Kitchener, Ont., it is reported, will soon be in the market for several new street cars.

Knoxville Power & Light Company has placed an order with the Cincinnati Car Company for fourteen cars of the most modern type. The order specifies seven single-truck cars and seven double-truck cars. The cars will cost $134,000 and first deliveries have been promised for February, 1924. The reported purchase was referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 22.

Track and Line

Frankford, Holmesburg and Tacony Railway, Philadelphia, during the present year has constructed and equipped with new rails 2 miles of road and it is proposed to construct 2 miles more next year and another 2 miles in 1925.

Princeton Power Company, Princeton, W. Va., will extend the west end line in Graham to Maple Hill Cemetery and Shelby Heights and the loop line to the fair grounds and Bluefield College.

Conestoga Traction Company, Lancaster, Pa., is building a new section to the Ephrata-Lancaster line which will pass through Talmage, Brownstown and Akron. Construction is expected to be completed by Nov. 1.

Asheville Power & Light Company, Asheville, N. C., is arranging for improvements to relieve congestion in the Pack Square district. A loop system of tracks will be laid and new equipment added. The improvements will cost about $200,000, C. S. Walters, vice-president and general manager, announces.

Power Houses, Shops and Buildings

Illinois Power & Light Corporation, Chicago, is planning to construct a power house at Venice, to cost $1,200,000.

Tri-City Railway, Rock Island, Ill., has decided not to erect the planned carhouse in Moline, it was learned. The project would have cost the company $60,000. The company, after considering the matter for some time, decided it could not afford to undertake this construction at this time.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, is improving its property, especially at Boone and Fort Dodge. The W. J. Zitterell Company has been awarded a contract for the erection of a new carhouse at Boone. President C. H. Crooks of the Fort Dodge line has announced that construction has already been started on the new buildings which are being erected at Fort Dodge, replacing structures destroyed recently by fire. The contracts for the new carhouse and yard office were let recently. The buildings will be of modern construction, brick and concrete, and the total cost will be about $150,000.

Trade Notes

American Gear Manufacturers' Association will hold its seventh semi-annual meeting at the Mountain House, Lake Mohonk, New York, Oct. 25, 26 and 27. The first general session of the meeting will be on Oct. 25, when the new president of the association, George L. Markland, Jr., of the Philadelphia Gear Works will preside. On Oct. 26 A. W. Copeland of the Detroit Gear & Machine Company will preside over a special meeting of the automotive group for the discussion of conditions in that industry.

Norma Company of America, Long Island City, has placed contracts for the erection of the first unit of its new plant upon its property recently acquired at Stamford, Conn. The company's Stamford plant will be equipped for the manufacture of Hoffmann precision roller bearings, the American rights to which, as well as to all other Hoffmann products, were recently acquired by the company from the Hoffmann Manufacturing Company, Ltd., of Chelmsford, Essex, England. The plant will also be equipped for the expansion of the manufacture of Norma precision ball bearings. The company's present plant at Anable Avenue, Long Island City, will be continued for the production of Norma precision open-type annular ball bearings.

Elliott Service Company, 244 W. Forty-ninth Street, New York, has announced through C. W. Price, vice-president in charge of the public safety division, that there is now available for the electric railways interested in reaching the public with the safety idea a plan for bringing about the introduction of instruction in accident prevention in the public schools in their respective communities. According to Mr. Price, electric railway executives were among the first to realize that the problem of street accidents will not be solved until the safety idea has been brought into the home, and that this can be done most effectively by getting school children interested in safety. Because of the increasing demand for literature and other material which could be used to introduce this subject in public schools, Dr. E. George Payne, professor of education of New York University, and author of the first definite plan for safety instruction in public schools, has prepared a series of eighteen pamphlets for superintendents, principals and teachers, together with detailed instructions and suggestions for the introduction of safety instruction in the present curriculum in the school system. This entire series by Dr. Payne may now be secured by electric railways for introduction in the public school system in their respective communities as part of the complete public safety service of the Elliott Service Company. Dr. Payne's plan is now in use in the schools of more than 100 cities. It is said that its adoption has made it possible for the cities of St. Louis, Kansas City and Detroit to cut accidents to children practically in half. In recognition of his pioneer work in this field and because of the growing interest in the subject of school safety on the part of students and graduate teachers New York University has created for Dr. Payne the first collegiate chair in safety education.

New Advertising Literature

Southern Pine Association, New Orleans, La., has issued the ninth revised manual of standard wood construction. This edition contains the information needed to solve every-day problems in wood construction.

Roller-Smith Company, New York, N. Y., has issued bulletin No. 450, describing alternating-current switchboard instruments, and bulletin No. 560 on the "safety" circuit breakers Types "P" and "E."

Rome Wire Company, Rome, N. Y., has issued two pamphlets, one describing its special, extra-flexible electric welding cable and the other the new super-service junior cord, suitable for many applications. A booklet of twenty pages has been produced giving full information on the super-service cords and cables.

Ohio Brass Company, Mansfield, Ohio, has issued its 1924-1925 catalog, which is a substantially bound book of nearly 800 pages, with special diagrams on high-tension insulators, trolley line materials, rail bonds and tools, third rail insulators and car equipment specialties. The book contains a classified index to materials, a catalog number index and a code word index.

Uehling Instrument Company, Paterson, N. J., has issued a new bulletin, 116A, which illustrates three simple devices which, it is claimed, completely eliminate three troublesome elements of the CO_2 recorder. In other words, they permanently prevent fouling and corrosion of the CO_2 equipment and the tubing which conveys the gas sample to the instrument continuously. These three devices are known as the "Pyro-Porus" filter, the gas drier and the gas purifiers. The bulletin also illustrates the small bore seamless drawn tubing used for the gas sampling line. This gives high velocity of gas flow, resulting in quick response to the CO_2 recorder to changes in furnace conditions. This tubing is much easier to erect than pipe, which was formerly employed for the purpose, and practically eliminates all possibility of sampling line leakage, which is a common failing of sampling lines constructed of pipe instead of tubing.

Will the motormen use it?

That's the test of an adequate hand brake!

Why install a hand brake at all, if the men don't know it, and trust it and use it when emergency demands it?

Perhaps they've never tried it; perhaps they've tried it and found it will not stop the car.

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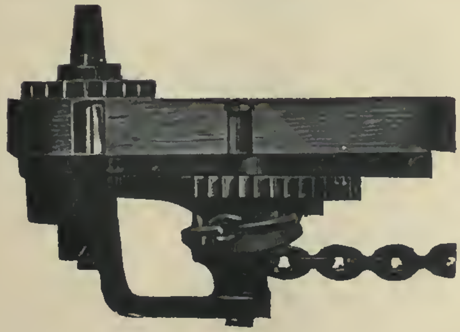

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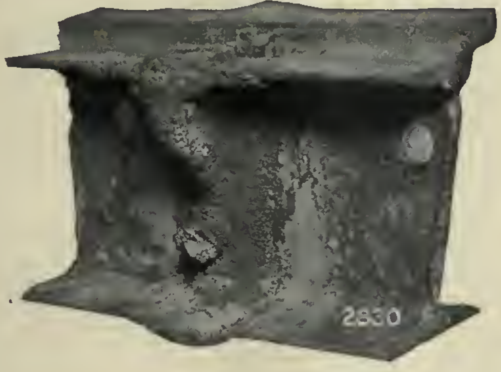

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Water	Heat	Cold	Snow	Chains	Impact	Age
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NOT by paving with materials which rain, temperature changes, or age deteriorate.

Not by paving with materials which are quickly abraded by traffic's wheels and chains.

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The recent business condition has brought to the forefront of thought many fundamental considerations that have always been known but have been damned with faint praise.

Human nature in the mass is very much like human nature in the individual. One of its dominant characteristics has been summed up in the observation, "You never miss the water till the well runs dry." We never appreciate fundamental things until we have occasion to do without them.

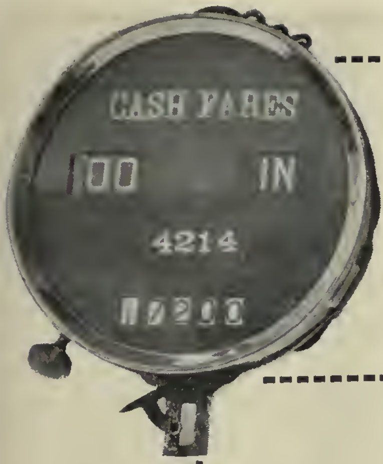
This observation has a special application to the Demand of the public for the products of industry. While the Demand was at high tide and everybody was busy trying to supply that Demand at a profit no one, seemingly, gave a thought to where the Demand came from, how long it might last, or what would happen if it should fail. We merely assumed the permanent existence of the Demand, just as we assume the presence of water, air, and fire.

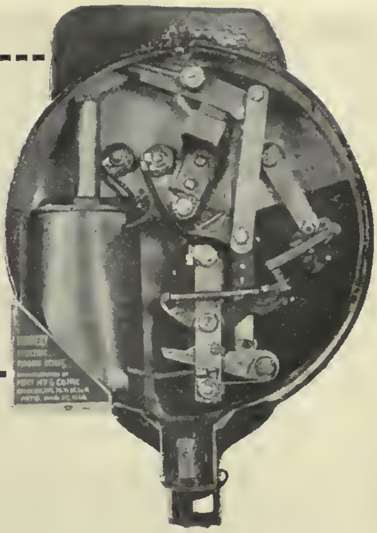
But a day came when Demand began to subside, and in many industries it came almost to a full stop. And then we missed it, and realized, as never before, what an important thing it was. And we began to inquire where it came from in the first place, and how it might be restored.

We always knew—everybody knew—that Desire for things made a Demand for them in the market. That people desired things we accepted as an elemental fact. But when we discovered that Desire fluctuated we began to appreciate that Desire, as we know it, is a thing created by the art of man. It is a highly specialized form of an elemental need—just as a Louis XVI chair is made out of a tree.

This discovery led to another equally important discovery that the means of refining and specializing that Desire was Advertising. The gigantic work that has been accomplished by modern advertising now stands out in bold relief. It has been the means by which the refinements of civilization have been made known and made desirable, and this desire has been made into Demand. It is a simple fact that a million profitable forms of industrial activity owe their very existence to the fact that Advertising upheld the standards of living which in turn provided the demand for their products.

[Published by *Electric Railway Journal* in co-operation
with The American Association of Advertising Agencies]





PEREY—

Instantaneous Visible Coin and Transfer Registering Device

Instantaneous, visible and automatic registration eliminates the human factor in fare collection. It speeds up passenger movement, leaving greater freedom to the car operator or conductor to use his hands for other work.

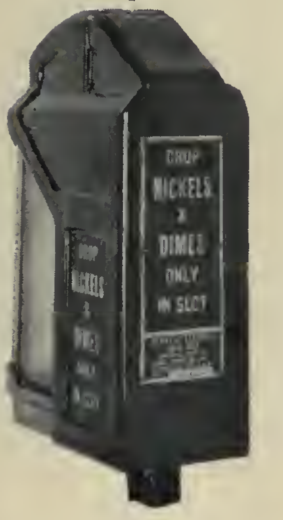
This principle was first developed by this organization, pioneers in developing equipment of various kinds for handling and speeding up passenger movement.

Some of the features which have made it successful under all conditions in actual service for the past five years are:—

Can be adapted to any kind of coin or token.

Will handle nickels and dimes, or tokens.

Can be adapted to any modern register now in service.



Write for details

PEREY MANUFACTURING CO., Inc.

30 Church St., New York, N. Y.

More Miles Between Shoppings

THE vastly greater durability of Ripolin, attained with fewer coats, in shorter time, and with less labor, results in the quicker return of your cars to revenue earning service.

The paint shop schedule is shorter, application is easier and the finish is attractive and marvelously durable.

Below we quote a few opinions from roads economizing with the Ripolin Enamel System on their cars:

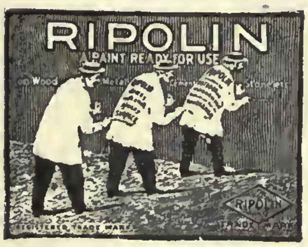
"We find the Ripolin finish saves time, material and labor."

"Cars are not out of service with the Ripolin System as long as with the Varnish system and they do not look shabby after two and one-half years."

"We use the Ripolin system because of its lower cost per car per year, longer durability and because it can be finished more rapidly."

Ripolin will do the same for your road.
Are you taking advantage of this opportunity?
Write for full particulars.

This design is the international identification mark of genuine Ripolin Enamel. All Europe knows this famous Ripolin trade mark.



The secret process of making Ripolin was discovered in Holland thirty years ago. Since that time Ripolin has been used throughout the civilized world.

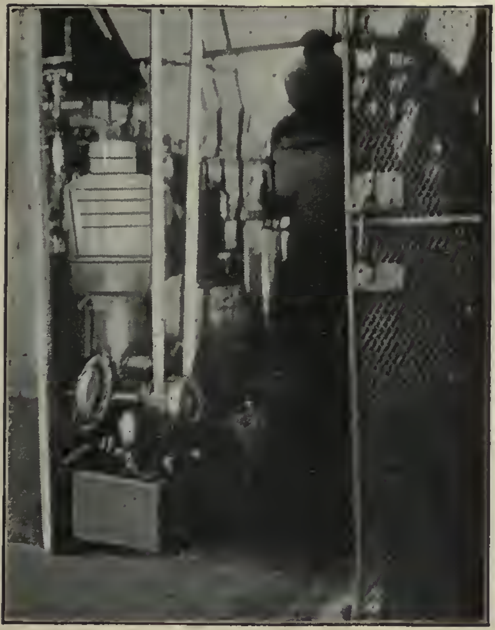
Every package sealed.

GLIDDEN
PAINTS — VARNISHES — STAINS — ENAMELS

THE GLIDDEN COMPANY

Factories from Coast to Coast *Branches in principal cities*
NATIONAL HEADQUARTERS CLEVELAND, OHIO

New Oil for Old!



De Laval Oil Purifier installed at shops of the Third Avenue Railway Company, New York.

In the power stations of the Commonwealth Edison Company, Chicago, De Laval Oil Purifiers are in constant service reclaiming turbine and transformer oils in large quantities. One of the Portable Transformer Oil Purifiers is shown above.

Railway companies are purifying used oils with

De Laval Oil Purifiers

The railway industry has awakened to the practical utility of the centrifugal method of separating water and other impurities from used lubricating oils.

One of the most recent installations in the electric railway field is found at the shops of the Third Avenue Railway Company, Third Avenue and 65th Street, New York City, where a De Laval Oil Purifier is used to centrifuge impurities from the oil recovered from the waste taken out of car journals.

The Milwaukee Electric Railway and Light Company has been using a De Laval Oil Purifier for about two years in the same service. This machine has saved an average of about 1200 gallons of oil a month during this time. Three other De Lavals used by the Milwaukee Company are purifying turbine lubricating oil, purifying the oil used to lubricate motors driving pulverized coal handling equipment, and dehydrating transformer oil.

There is a De Laval Bulletin covering each of these various services. Write for the one in which you are interested.

THE DE LAVAL SEPARATOR CO.

New York, 165 Broadway
Chicago, 29 East Madison Street

DE LAVAL PACIFIC COMPANY
San Francisco

Sooner or later you will use a

De Laval

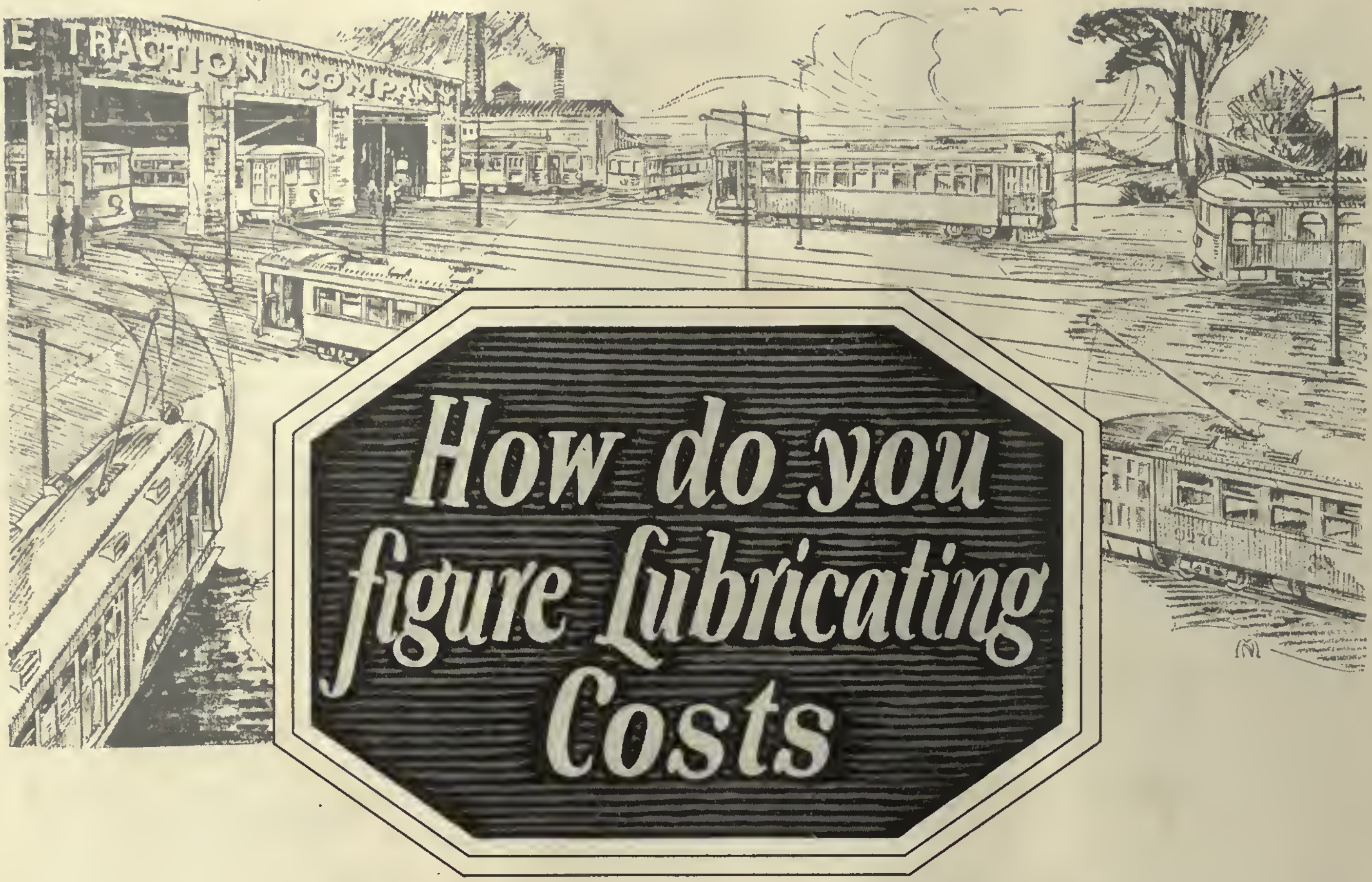
Please send Bulletin containing further information regarding

☐ Reclamation and purification of car axle oil.
☐ Purification of turbine lubricating oil.
☐ Purification of Diesel lubricating and fuel oil.
☐ Purification of motor oil.
☐ Dehydration of transformer oil.

Name ....

Company ....

Address ....E. R.-J



How do you figure Lubricating Costs

WHEN you figure accurately your lubricating costs per car mile, it is necessary that you include other costs in addition to that of the oils and greases used. Rightfully included are losses due to "pull-ins," because of hot boxes; labor costs of oiling, of renewing and washing waste; the cost of the waste itself; and the labor and material costs of rebabbitting bearings prematurely worn because of poor lubrication. When all these items have been added to the cost of the lubricants, you will have an accurate figure on which to base your *lubricating* costs.

It is upon this basis that the *reduction* in costs is most pronounced when Standard Lubricants are used. One company who uses these products showed a reduction of 50% in lubricating costs, and another of 30%. Still another record indicated runs of 45,000 miles without a change of waste being necessary, with a corresponding decrease in cost. A large company operating 1600 cars writes us that during the four hot summer months, no bearing failures took place.

These companies are lubricating their rolling stock according to the recommendations of our lubricating engineers. Among the oils and greases which they are using are

Standard T. M. and L. C. Motor Journal Oils

which are made expressly to stand the hard gruelling work of traction service. Careful refining prevents them from glazing or hardening on the waste. This factor enables you to reduce your oiling periods, saving the labor costs and the cost of waste. Because every bit of oil in the reservoir is used, hot boxes are not frequently encountered, and therefore, the loss due to "pull-ins" is at an absolute minimum.

Standard service is another important factor in reducing your costs. The company has warehouses and branches in almost every important town and city in its territory. These warehouses carry your supply of lubricants on hand at all times. Our trucks deliver them to you in iron barrels as they are needed and pick up the empties, without extra cost.

If you have been paying labor and cartage costs on oil barrels to and from freight depots, you will appreciate the saving this service will make for you. One Michigan traction company saved $600.00 in one year on this item alone.

Results such as we have given above are not at all unusual with the companies which are following our recommendations. If you care to write to any of those we have mentioned, their names will be furnished on request.

In the meantime, our engineers will be very glad to go over your lubricating problems and help you to find the solutions. Address our nearest branch office or write direct to

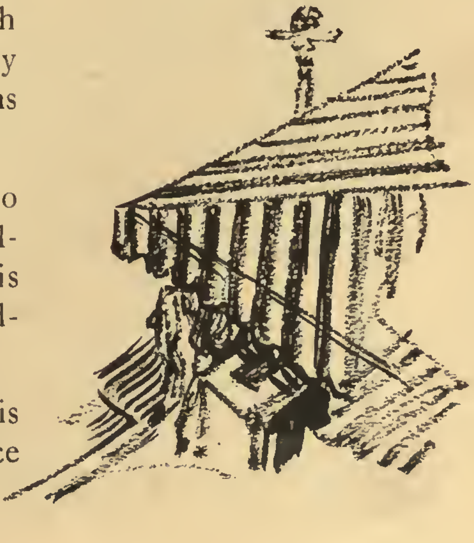
STANDARD OIL COMPANY
(INDIANA)
910 S. Michigan Avenue CHICAGO, ILLINOIS

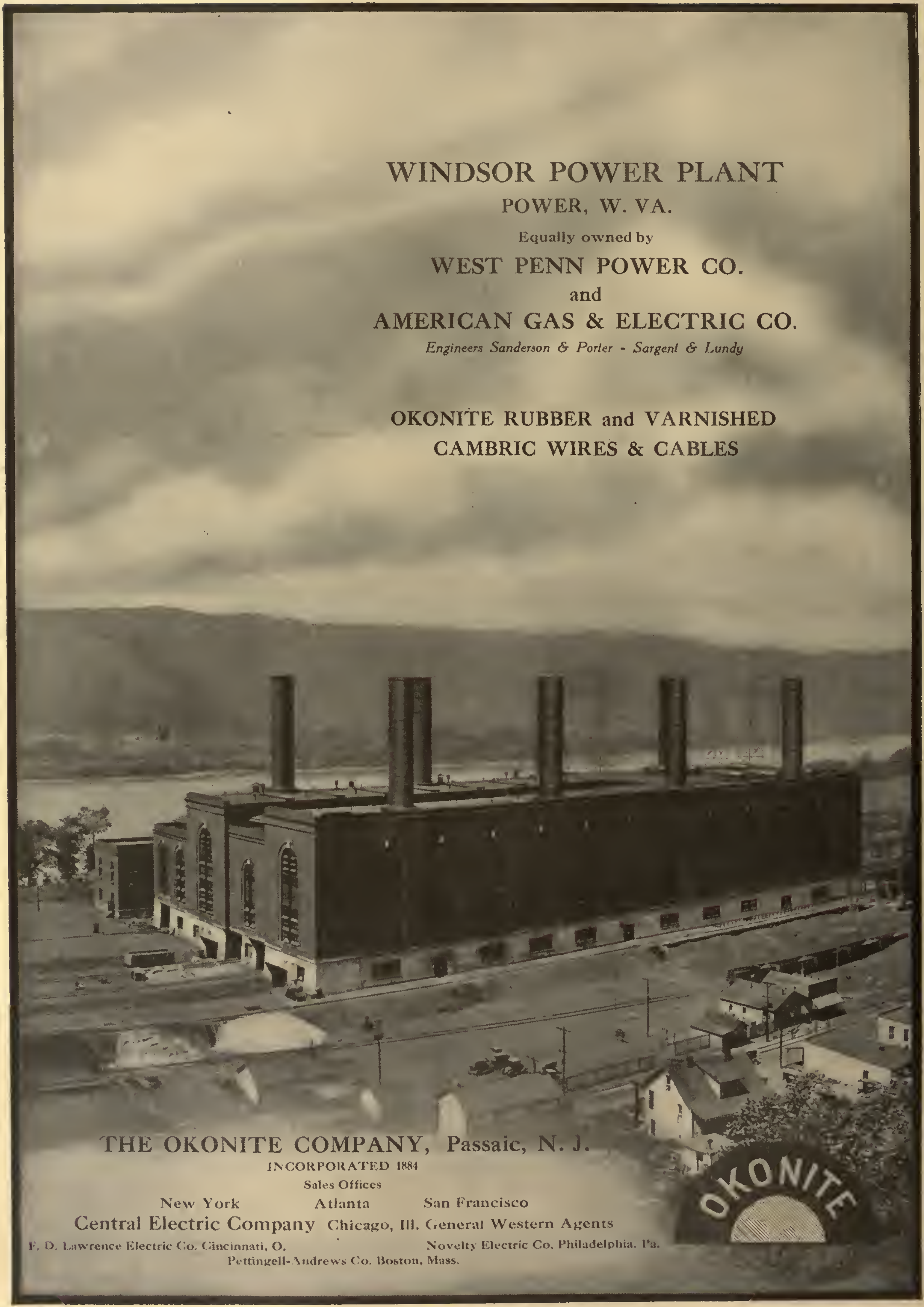
1923 Convention Exhibit Section

Manufacturers have spent hundreds of thousands of dollars to show their electric railway equipment materials and supplies exhibited on the Pier. There hardly can be stronger evidence of confidence in the merit of a commodity than such willingness and eagerness to have you inspect it critically. Every exhibitor invested in his exhibit because he had good reasons to believe that he has a worth-while service to offer you.

Some manufacturers have bought space in this supplement to advertise their exhibits and to bring them to those electric railway men who could not be at the convention. Here, then, is further evidence of well-founded faith in the merits of the products or services shown.

It will pay every electric railway man to read every page of this Supplement—it presents many products for improving service and reducing expenses.





WINDSOR POWER PLANT

POWER, W. VA.

Equally owned by

WEST PENN POWER CO.

and

AMERICAN GAS & ELECTRIC CO.

Engineers Sanderson & Porter - Sargent & Lundy

OKONITE RUBBER and VARNISHED CAMBRIC WIRES & CABLES

THE OKONITE COMPANY, Passaic, N. J.
INCORPORATED 1884
Sales Offices
New York Atlanta San Francisco
Central Electric Company Chicago, Ill. General Western Agents
F. D. Lawrence Electric Co. Cincinnati, O. Novelty Electric Co. Philadelphia. Pa.
Pettingell-Andrews Co. Boston, Mass.

The Westinghouse Exhibits-
your standards of comparison

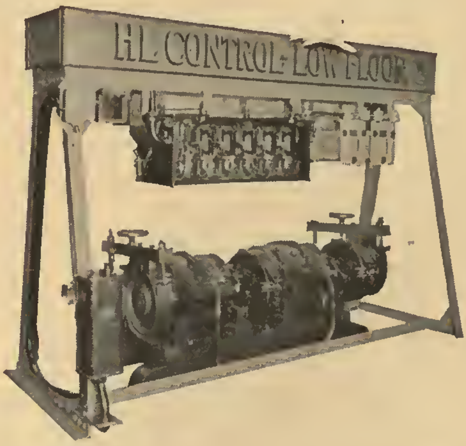
A·E·R·A
CONVENTION
1923
WESTINGHOUSE
SPACE NOS.
15B-216

Standard Motors and Control —
the basis of reliable operation

The Westinghouse Company has placed on exhibit for the 1923 Convention typical pieces of apparatus representative of its entire line of equipment designed to meet the present day needs of the Electric Railway Industry. Westinghouse standard motors and control are the result of years of experience in research, design and manufacture. Each piece of apparatus embodies improvements of design made possible by close cooperation of operators and the manufacturer after having taken into consideration the operating problems facing the Industry.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Typical Motors Exhibited
Type 508—25 H.P.
Type 510—35 H.P.
Type 514—40 H.P.
Type 535—60 H.P.



W
WESTINGHOUSE ELECTRIC

Westinghouse

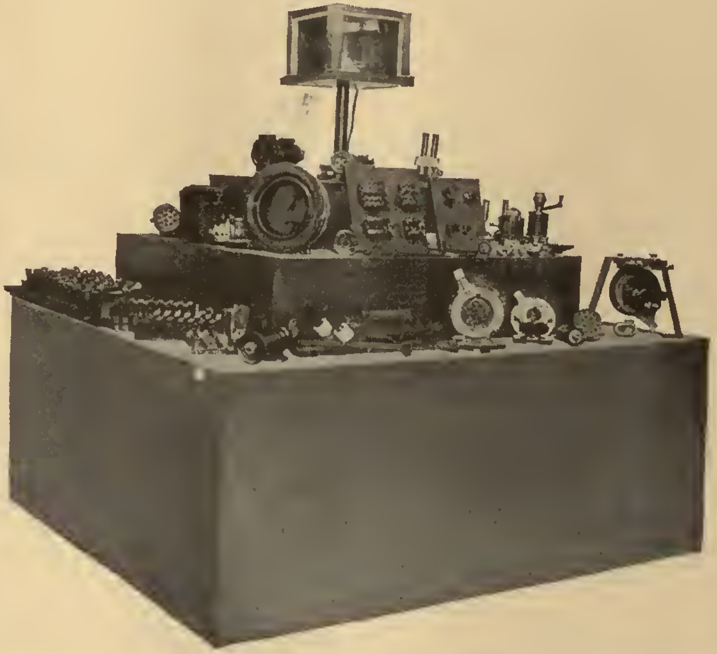
A·E·R·A
CONVENTION
1923
WESTINGHOUSE
SPACE NOS.
15 B – 216

The Westinghouse Exhibits-
your standards of comparison

Renewal Parts —
on the Westinghouse Pyramid

Among the many improvements on Renewal Parts to be shown at the A. E. R. A. Convention is the External Fan for obtaining increased rating on old non-ventilated motors.

Another innovation is the Control-Repair Bench for Magnet-Valve maintenance. Other parts of Westinghouse quality will be shown on the Renewal Parts pyramid.



WESTINGHOUSE
ELECTRIC

Westinghouse

The Westinghouse Exhibits-
your standards of comparison

A·E·R·A
CONVENTION
1923
WESTINGHOUSE
SPACE NOS.
15B – 216

Trolley Line Material ——— everything you need from A to Z

Whether you are interested in direct suspension or catenary line construction, there's food for thought in the Westinghouse exhibit. Two large boards display every part needed in an easy-to-see, easy-to-handle manner.

Nearby on another board you will find the new "Duro" Strain Insulator—born of painstaking experiment and searching practical test.

Note many little points of improvement in design; many little points of simplified construction which mean economy in service. Westinghouse materials are essentially a "safe" buy.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

MEMBER
AMERICAN ELECTRIC RAILWAY ASSOCIATION
AERA

W
WESTINGHOUSE
ELECTRIC

Westinghouse

A·E·R·A
CONVENTION
1923
WESTINGHOUSE
SPACE NOS.
15B – 216

The Westinghouse Exhibits-
your standards of comparison

An Important Development in Arc-Welding

New in the sense that it has never been offered to the railway operator before; old in the sense that many years of experiment and searching test have proved its practical efficiency—that's the new Westinghouse Arc Welder.

You must not fail to know its many unique features; the sensitiveness of current control, and ease of operation.

Demonstrations will be held at the Westinghouse Exhibit. You are cordially invited to attend.

W
WESTINGHOUSE
ELECTRIC

Westinghouse

The Westinghouse Exhibits-
your standards of comparison

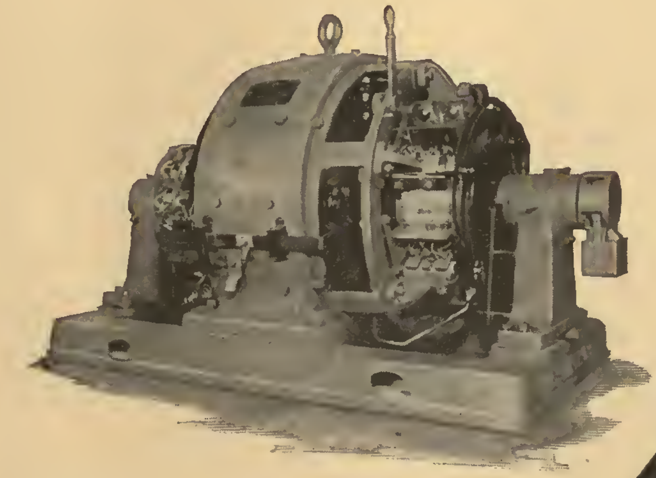
A·E·R·A
CONVENTION
1923
WESTINGHOUSE ELECTRIC
SPACE NOS.
15 B – 216

The first electro-pneumatically controlled Automatic Substation

A gentle hum—the occasional click of a switch—that's all! Day after day, without the touch of a human hand, the new Westinghouse Electro-pneumatically Controlled Substation will supply the varying current needs of a city's electric railways. As if touched by ghostly fingers the controls move to compensate for each fluctuation in power flow.

A complete station in actual operation will be a vitally interesting feature of the Westinghouse Exhibit. Study its unique features for it marks a new era in economical power supply.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania



W
WESTINGHOUSE ELECTRIC

Westinghouse

A·E·R·A
CONVENTION
1923
WESTINGHOUSE
SPACE NOS
15B–216

The Westinghouse Exhibits-
your standards of comparison

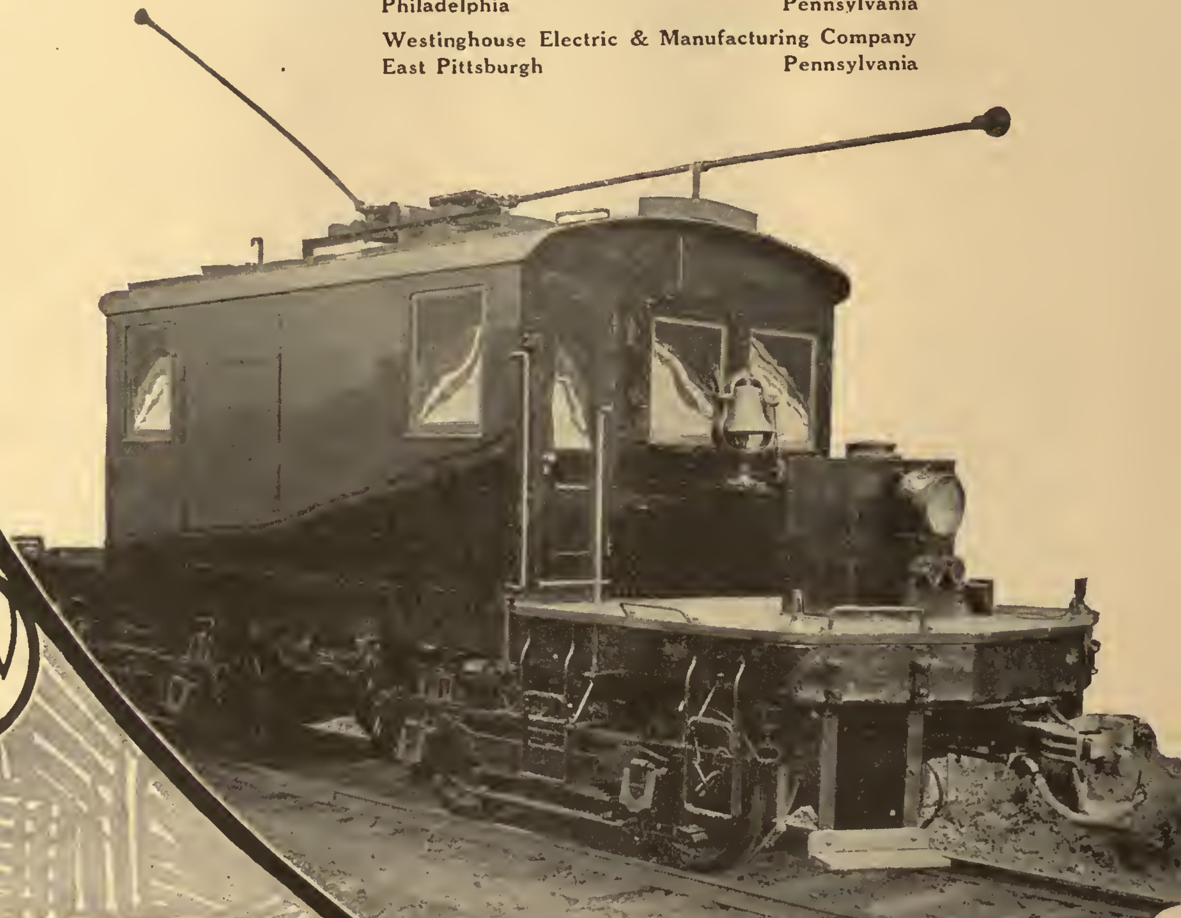
A Freight Haulage Standard —

Consider the features which you would desire in a locomotive to adequately meet your freight haulage requirements. The Westinghouse 50 ton Class B-1 locomotive exhibited on the Reading Tracks at the Boardwalk two blocks south of the Pier, provides unusual accessibility of parts, a roomy cab, large decks and clear vision from either end.

Address either Company

The Baldwin Locomotive Works
Philadelphia Pennsylvania

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania



Baldwin-Westinghouse

To the
Keystone Exhibit
A.E.R.A. Convention

Space 414

Car specialties worth examining!

Keystone-Hunter Route and Destination Signs.
Golden Glow Head-lights.
Faraday Car Signal Systems.
Keystone Steel Gear Cases.
Keystone Motormen's Seats.
Keystone Compensating Lighting Fixtures.
Peerless Pinion Pullers
(and many others)

A cordial welcome awaits convention visitors at the Electric Service Supplies Company exhibition booth, space 414.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.
PITTSBURGH
829 Oliver Building

NEW YORK
50 Church St.
SCRANTON
316 N Washington Ave.

CHICAGO
Monadnock Bldg.
BOSTON
88 Broad St.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver
Equipment & Engineering Co., London Eng., Ing S. Belotti & Co., Milano, Italy
L. J. Healing & Co., Ltd., Yokohama, Tokio, Kobe and Osaka, Japan.
Ernest Demoly, Paris, France. Electro-Traccion, Madrid, Spain.

A Record of Achievement

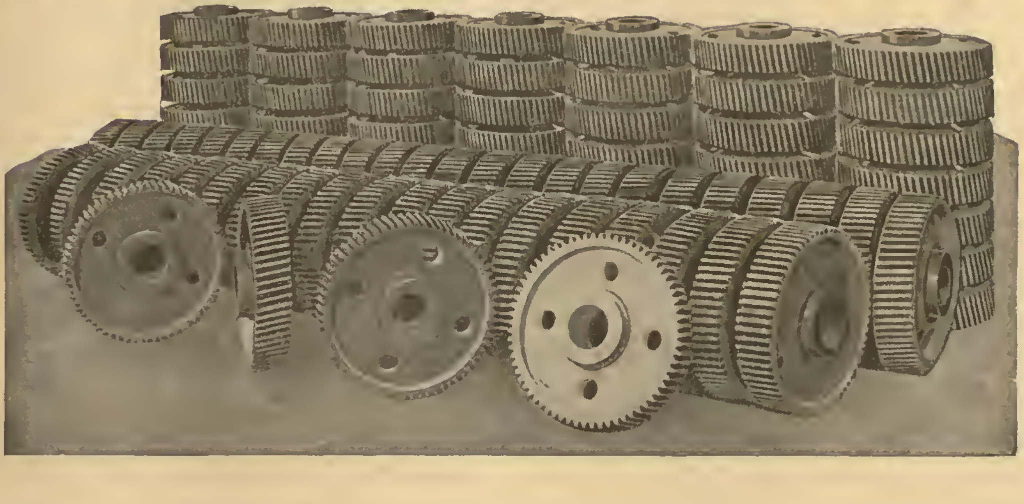
MORE THAN 9000 SAFETY CARS
In Service With Our Equipment
ON MORE THAN 400 PROPERTIES.
SAFETY CAR DEVICES CO.

From the Safety Car exhibit of the Safety Car Devices Co., A. E. R. A. Convention, Atlantic City, October 8-13, 1923.

—and the Safety Car will continue to grow because it is the logical solution of the economic problems entering into electric railway operation under present conditions.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Hey! Hey! Have a look!



Nuttall is actually cutting Helical Gears

at Booth No. 17

A.E.R.A.
CONVENTION
EXHIBITS

Watch for

Nuttall's Announcement of a Timken Roller Bearing Trolley Base

See a sample at the Exhibit

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

Nuttall

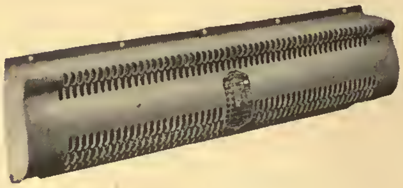
**Take the
New Visible
Thermostat
in your own hand**

A Close-up view at our exhibit

Booth No. 22

Learn from us what the Consolidated Visible Thermostat actually is, and from the railway men present who have used it—what it actually accomplishes.

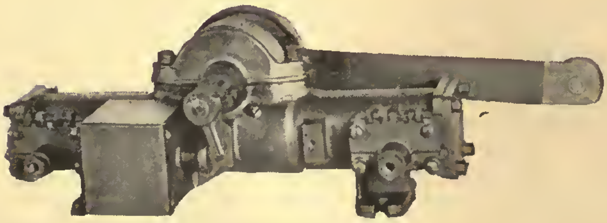
The Entire CONSOLIDATED Line is Here!



HEATERS—All STYLES

BUZZERS

SINGLE STROKE BELLS



PNEUMATIC DOOR ENGINES TO MEET ANY CONDITIONS

Interested in heaters? They're here! Or signal systems? They're here!

Door-operating engines? They're here, too!

The Consolidated Line is built on experience. The millions of Consolidated Devices in actual service all over the World are evidence of their popularity. Ask the man who uses them.

Don't miss our Exhibit

Consolidated Car Heating Co.

Albany

New York **Chicago**

HUBBARD

ELECTRIC RAILWAY SPECIALTIES

Hubbard Pole Bands with Pull-Off Rods

The Pull-Off Rod feature eliminates the necessity of more than one band per pole.

Any number of guys may be secured to the rod.

Peirce Forged Steel Feeder Pins

Peirce Pins are forged from open hearth steel and are designed for heavy duty.

A dependable pin for corner work.

Hubbard Turnbuckles

Hubbard Turnbuckles are drop forged from open hearth steel and are galvanized by the hot dip process. Made, also, in hook and clevis combinations.

Hubbard Trolley Pole Bands

Hubbard Trolley Pole Bands are made in several styles to meet every requirement. They are hot-dip galvanized the Hubbard way.

In addition to the special fittings described in the accompanying panels, *specify Hubbard* for your entire requirements in pole line hardware and construction specialties for high tension transmission, low tension distribution, telephone and signal work.

All Hubbard material is made of new rolled open hearth steel having a tensile strength of 55,000 to 65,000 pounds per square inch and is galvanized by the hot-dip process.

There are 124 leading electrical jobbers throughout the United States, who carry stocks of Hubbard material. There is one near you—

Ask Your Jobber

HUBBARD & COMPANY

Pittsburgh **Chicago**

Peirce Insulated Pole Bands

Peirce Insulated Pole Bands are in popular use on account of their neat appearance and strength. Bands are furnished with or without insulators for all sizes of poles.

–Ask your Jobber

"Designed for passenger comfort
Built for practical service"

Visit the Display of

HALE & KILBURN CAR SEATS

On the Pier

SPACE 406-408

Standard Interurban Steel Seat

Standard Rattan Walkover Steel Seat

Lightest Weight Stationary Steel Seat

Lightest
Strongest
Simplest
Neatest

Hale-Kilburn Company

General Office and Works:
PHILADELPHIA

Sales Offices:

New York
30 Church St.

Chicago
McCormick Bldg.

Richmond
Mutual Bldg.

Atlanta
Candler Bldg.

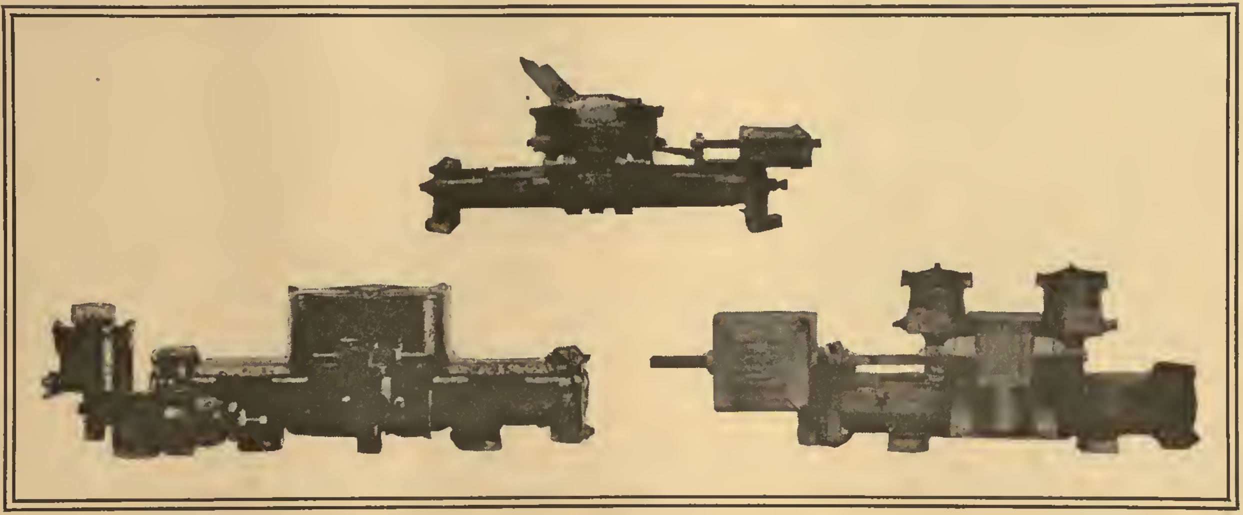
San Francisco
71 First St.

Los Angeles
447 E. 3rd St.

Hale and Kilburn SEATS

Accident Preventers—Time Savers Comfort Promoters

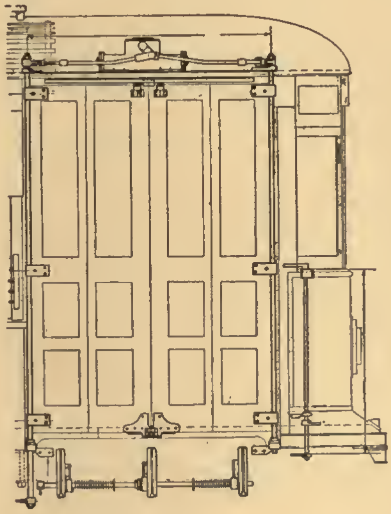
SPACE 12-14-16-18



NATIONAL PNEUMATIC

Door and Step Operating Mechanism for every condition of service

THE STANDARD EQUIPMENT
IN USE ON OVER 65,000 CARS
THROUGHOUT THE COUNTRY



National Pneumatic Company, Inc.

Originators and Manufacturers

PRINCIPAL OFFICE: 50 Church Street, NEW YORK
Philadelphia—Colonial Trust Bldg. Chicago—McCormick Bldg.
Works: Rahway, New Jersey
Manufactured in Canada by Dominion Wheel & Foundries, Ltd., Toronto, Ont.

That question about—

Wire wear with MILLER Trolley Shoes

Where the average annual wear was 0.003 in.

That's the record made on the 4/0 wire of the Portland-Lewiston Interurban, entirely Miller Trolley Shoe equipped during the past six years. Measurements were taken at 45 different points, and carefully checked. There were 16,000 car passes per year. At the rate of wear shown during these six years, it is evident that the 4/0 wire will last through fully two million car passes with Miller Trolley Shoe contacts.

Questions about these and other tests are interesting more and more electric railway operators every day.

The answer at the—

MILLER Trolley Shoe Convention Exhibit

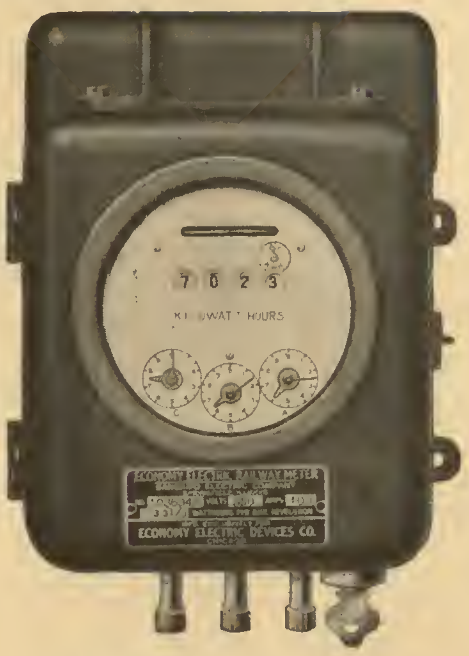
With Economy Electric Devices Co.

at Space 616

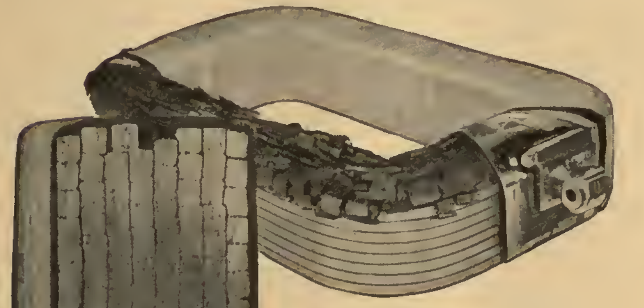
MILLER TROLLEY SHOE CO., Boston, Mass.

ECONOMY METERS

Whether you are operating one car or three thousand, it will pay you to investigate this simple, rugged, energy measuring device. It is inducing savings from $\frac{1}{3}$ to $\frac{1}{2}$ cent per car-mile on more than 100 properties. Its records are of high value for managerial and engineering purposes. Let us quote on your requirements and answer detailed questions.



Meter the energy
that's what you want to save



50 to 60%
Less Weight

ALUMINUM FIELD COILS

Their electrical and service efficiency has been proved by fifteen years' service in Europe and by their present use on more than 60 American railways. In addition to the great saving in weight, they possess such advantages as *longer life, quicker conduction of heat, less affected by moisture, less terminal trouble* and for many types, a distinct saving in price.

AIR RECTIFIER

If you have ever had trouble from "frozen air," let us show you how this simple device will *eliminate* that trouble. An Air Rectifier automatically mixes alcohol and its vapor with the water and air, lowering the freezing point so that the air can expel the water from the system. It holds 3 pints, sufficient for 90 days' operation. Hundreds of cars now equipped. Let us explain the operation and advantages of this device.

Eliminate
"Frozen Air"

Economy Electric Devices Co.
Old Colony Bldg., Chicago, Ill.

Yes, we're here
as usual

at

Booth 23

Trolley Material
Electric Car Equipment
High Tension Insulators
Electric Welding Equipment
Rail Bonds and Bonding Tools

Also
The Original Toonerville
Trolley Car

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W.Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulato

The Movement Toward Steel Ties Is Accelerating Rapidly

WHEN an accumulation of experience seems to dictate a certain course of action, commendable conservatism holds back a certain proportion of any group from following immediately.

Good engineering judgement approves your proceeding with such caution when an innovation is under consideration, but on the other hand, if progress passes you, it may cost you and your company money. Here, then, is the point in our review of the advancement steel ties have been making since you last investigated them. *We advise investigation from first-hand sources of the performance of Steel Twin Tie Track.*

It is our constant effort to facilitate this method of promoting the sale of our product, because when Steel Ties are adopted on the basis of the experience of others, obtained first-hand, we are secure in the belief that we have made a permanent business relationship.

To this end, to make convenient your consideration of Twin Tie Track, we are exhibiting a two thousand foot motion picture film at the Forty-second Convention of the American Electric Railway Association, just what you might have seen if you had visited five representative properties from Baltimore on the East to Detroit on the West during the track construction seasons of 1922 and 1923.

The motion picture camera has made a truthful record of all the details of track construction with steel ties as well as novel methods and labor-saving equipment used on these properties.

Plan to see the picture at the Convention and to find out *why* the movement toward Steel Ties is accelerating so rapidly.

What Happened in 1923?

Fifteen Technical Articles describing methods of installation and performance of steel tie and concrete construction appeared in the past year.

Twenty-six new users of Steel Twin Ties made their first installation in the United States and Canada in 1923.

The first shipments of Steel Twin Ties to be made via Panama Canal were loaded at Baltimore for San Diego and Portland, Oregon, in 1923.

The first method of efficiently reconstructing worn-out steel tie concrete base track was worked out on a main traffic artery in Cleveland. All the details are shown in our motion picture to be presented at the Convention.

In 1923 thirty-five percent of our business came from users whose first installation is from five to twelve years old.

The International Steel Tie Co.
Cleveland

SPACES 121-123-125, Machinery Hall
Young's Million Dollar Pier, Atlantic City

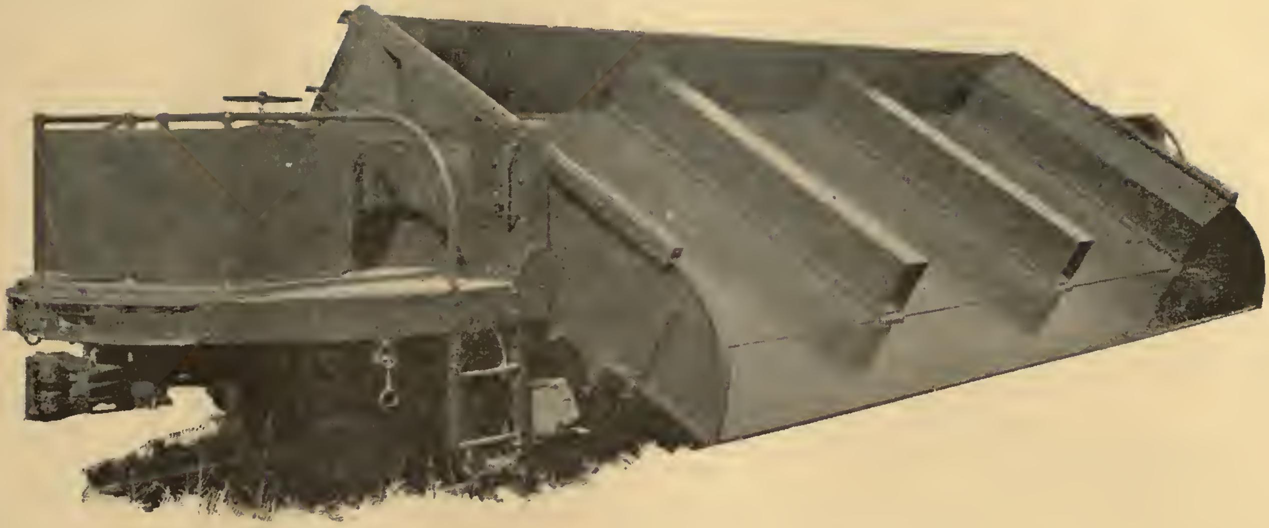
Meet us at this Convention

Differentials demonstrated. Facts and figures furnished.

We welcome this opportunity to give you all the data on maintenance and construction savings, made possible by the use of Differential Cars. There are actual reports, too, of phenomenal earnings made where Differentials are used in hauling freight for other companies. Differentials have proven to be by far the most economical method of disposing of ash and waste material.

Investigate them here and now.

**The Differential
Steel Car Co.
Findlay, Ohio**



Announcing

The New

Differential Door-Chute Car

Door folds down to horizontal position during lateral movement of body, thus forming a chute which places material further from track. Tilting of body, opening of doors, and closing of doors is all automatic—dumps to either side. Only labor required is operation of control handle.

At the Convention—Atlantic City—Booth 583

The Differential Steel Car Co.

Findlay, Ohio, U. S. A.

Forty eight hundred *Gold Car Heaters*

Will keep the "nip" out of Brooklyn's new cars

with the mercury curled up in its bulb. Driving snow; and sidewalks caked with ice. Winter streets are good places to be out of.

But Winter's paw can't get far inside the doors of Brooklyn's new cars. For each will be equipped with 24 Gold Electric Car Heaters—12 Type 478-E truss plank heaters; 10 Type 414-E single coil panel type; and 2 cab heaters; type 470-E. All with interchangeable coil supports and interchangeable coils on truss plank and panel heaters.

And with one eye on passenger comfort, the Brooklyn R.R. kept the other on economy when making this choice. Many years of practical service test on the Brooklyn Subways; the Public Service Railway of New Jersey; the New York Central and other famous lines has proved the efficiency and low final cost of Gold Heating Systems.

These types adapted to every class of service from safety car to railroad car; also for waiting rooms, etc.

WRITE FOR OUR PROPOSITION

Gold Car Heating & Lighting Co.
Bush Terminal, 220 36th Street, Brooklyn, N. Y.

No. 478-E Single Coil Truss Plank

No. 414-E Single Coil Panel

No. 470-E Three Coil Cab

How Come?

Come-to the "How-to" Booth

(Spaces 110-112, near main entrance)
Adjacent Electric Railway Journal Headquarters

LINGER—LOOK—LISTEN and LEARN

"How to" SUCCESSFULLY Weld MANGANESE, without Pre- or Post-Heating.

"How to" INSURE GOOD Welds, in General Arc-Welding.

"How to" ELIMINATE, "Joint," "Bond" and "PAVING" Maintenance.

"How to" Prevent ELECTROLYSIS.

"How to"......"Sell Rides," in competition with "Pneumatics."

"How to" Earn $10,000.00 with $1,000.00.

"How to"......"INDIANAPOLIS" Your Tracks.

Our "Booklet" tells all this and MORE. Take it along, or let us mail it.

GET THIS from, the ORIGINATORS of, and PIONEERS and LEADERS in METAL ELECTRODE Arc-Welding for RECLAMATION and Construction, also METAL ELECTRODE Arc-Welded "Joint and Bonding Plates"

"APEX" "SIMPLEX" "DUPLEX"
TESTED JOINTS (and Proven)

CONDUCTIVITY: (GREATER than unbroken rail)—By U. S. Bureau Standards, 1915.

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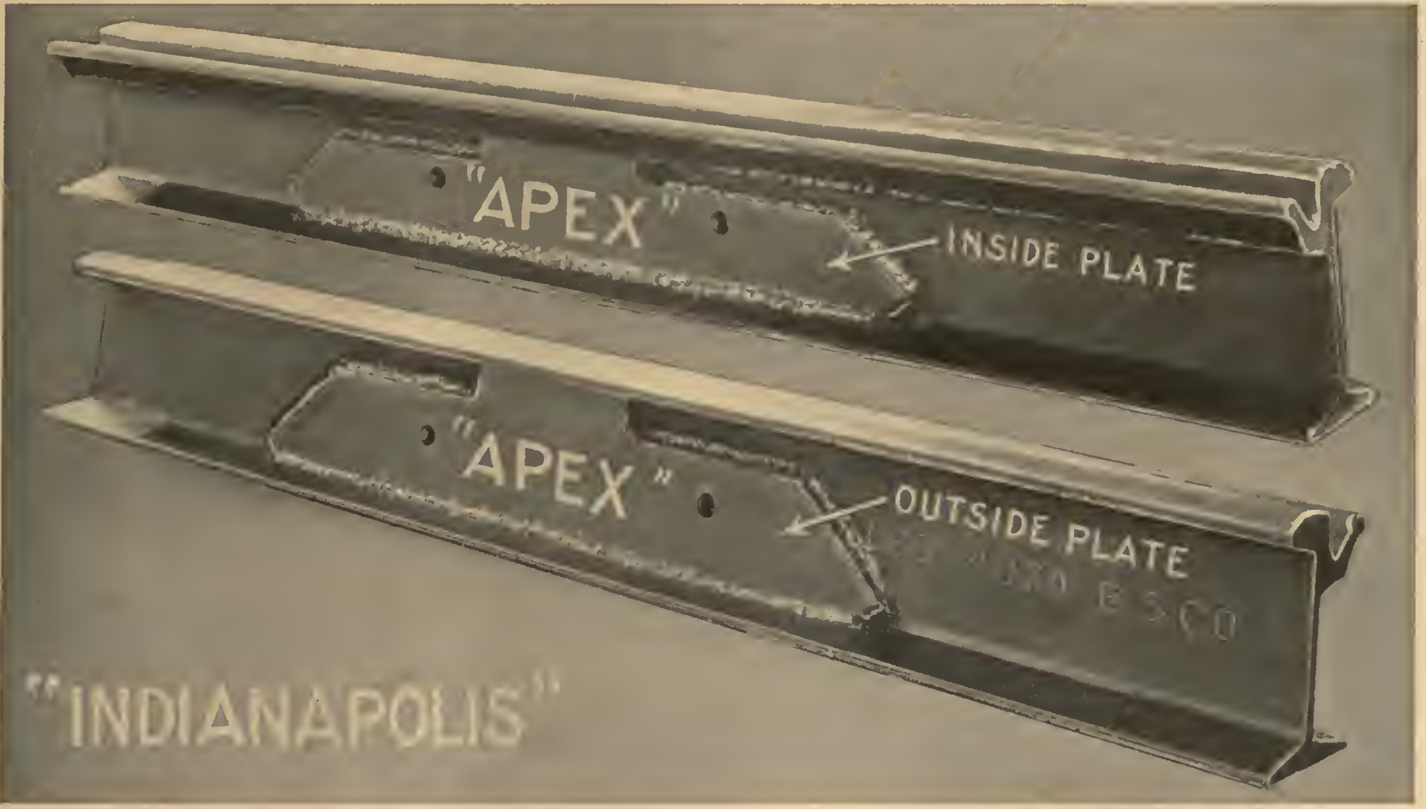

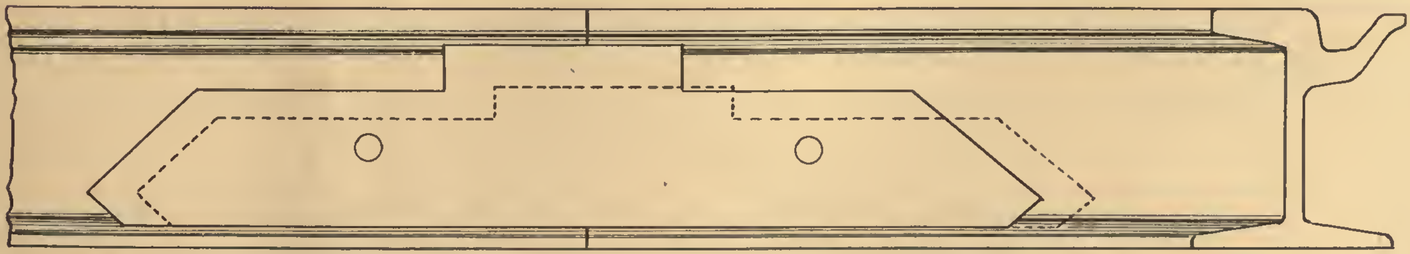

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Built Right—Low In Maintenance

Our development of this guard qualifies us to know that to cheapen or weaken its construction will defeat its efficiency.

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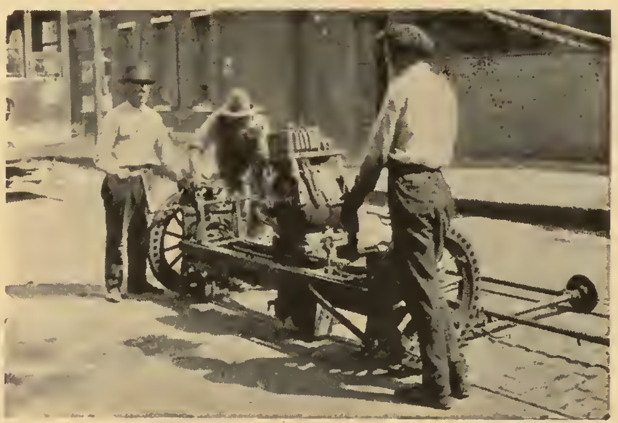
Make sure not to miss the

RAILWAY TRACK-WORK EXHIBIT

Let us show you how systematic care of rails and special work will save not only in track costs, but also in rolling stock maintenance.

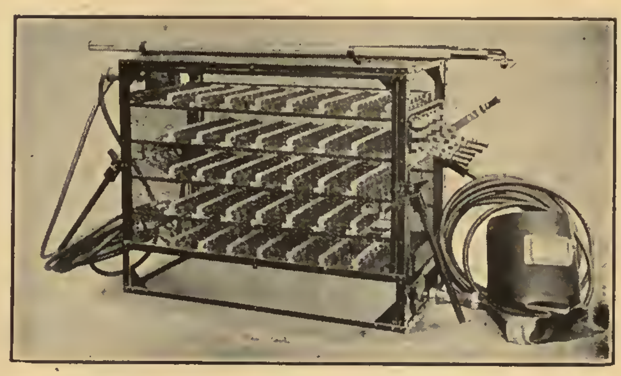
"Atlas" Rail Grinder

for following up welding operations and securing a smooth riding rail, at every built-up joint, switch and frog. Fast and efficent—easily handled.



"Universal" Rotary Track Grinder

for finest finishing, accurate truing of gauge lines, grinding in grooves and pointing-up special work. Its tilting grinding wheel permits closest work.



"Ajax" Electric Arc Welder

for building up battered special work, and cupped joints and for rapid rail bond welding. Its unusually high ampere capacity gives deeper and stronger welds.

A.E.R.A.
Exhibits

At Booths
171 and 173

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for beating the corrugation evil. Removes only the minimum metal necessary to get a smooth-running surface and restores the original contour of rail head.

"Hercules" Swing Frame Grinder

Grinds at any angle-head, back or in groove of rail. Does anything a flexible-shaft outfit can do and eliminate the disadvantages of that type. Sturdy, light-weight, quick-portable, moderately priced.

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1923 A. E. R. A. Exhibit Features

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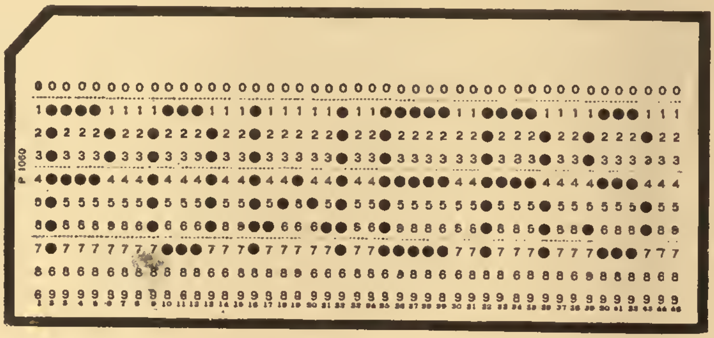
THE effectiveness of accounting or statistical records to the Comptroller, Research Engineer or Executive of a railroad is mainly dependent upon quick and accurate assembling of facts.

An automatic method, heretofore unobtainable, is now provided by the Powers Accounting Machine service. By this system facts and figures vital to intelligent railroad operation are *mechanically* classified and presented at the time they are needed and in the form best suited to enable action.

It will pay you to investigate the Powers System at Booths Nos. 666 and 668 to see for yourself how rapidly and accurately it provides the vital figures on railroad operations some of which are listed below.



FINANCIAL STATISTICS

- Material Costs, Distributions and Control
- Labor Costs and Distributions
- Property Valuations
- Construction Costs
- Budgetary Accounting
- Essential Operating Costs
- Auditing Conductors Reports
- Maintenance Costs
- Association Statistics

OPERATING STATISTICS

- Electric Consumption
- Personnel Maintenance
- Community and Capacities
- Route and Feeder Service
- Commodity Transportation
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- Fuel Cost Comparisons
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One aim only has directed the activities of this company—to build a bus that *will carry passengers, comfortably, efficiently* and *economically.*

Our first fleet starts operation in Philadelphia November first.

Come and ride on a Philadelphia Motor Coach and realize the tremendous strides that have been made in bus construction.

One ride will tell you more than a hundred pages of advertisements or an album of pretty pictures.

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SPECIAL
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Consult our representatives about your trackwork problems.

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For over half a century Wharton Trackwork has been meeting the requirements of the leading railways

1923

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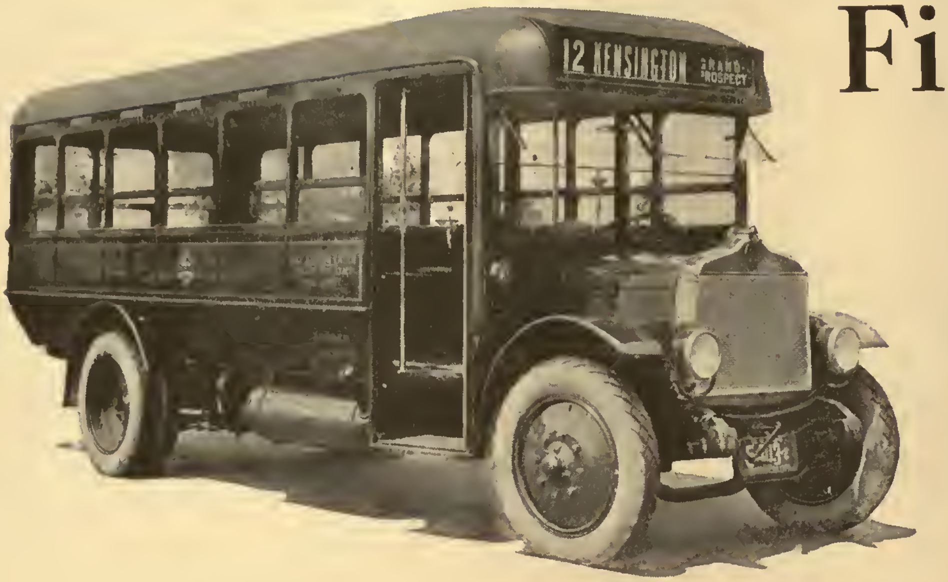
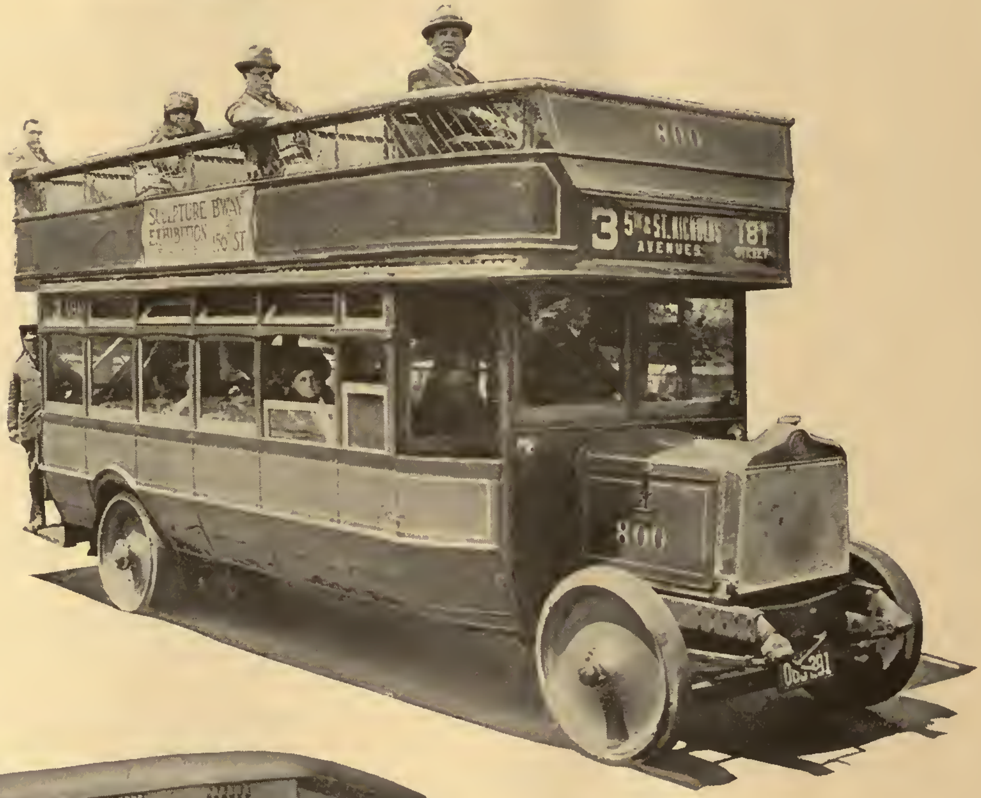


Model J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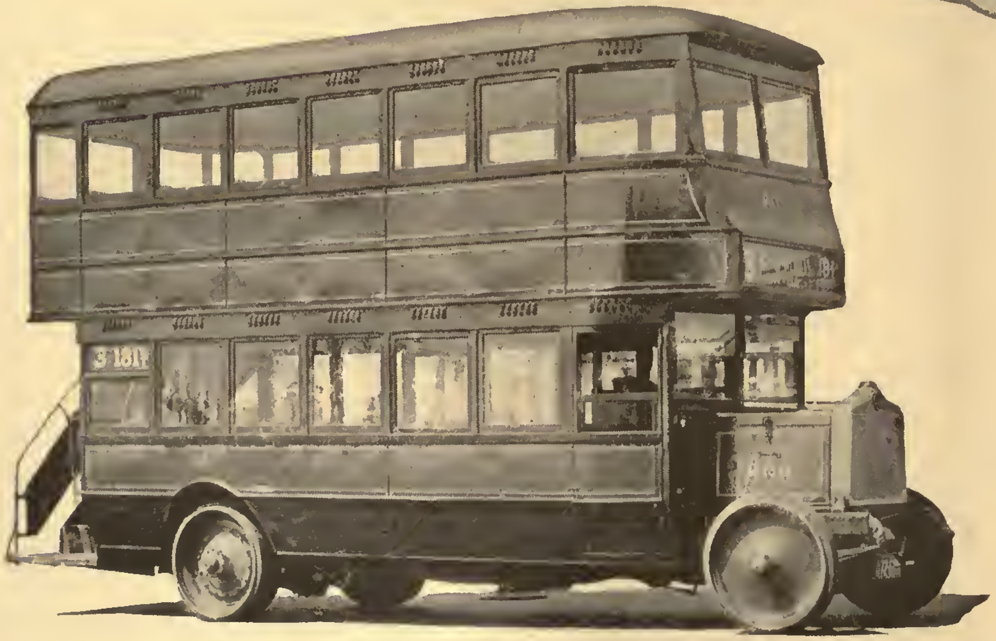

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ue Buses at Atlantic City

A Fifth Avenue
transportation system
for any community

Fifth Avenue Buses Anywhere

ARE you interested in buses? Here is an unusual opportunity to examine the exhibits of America's pioneer bus operating and manufacturing company.

How Fifth Avenue Buses are built—how they are operated—how they are maintained—how they will meet any kind of passenger transportation requirements, anywhere—these things will be made clear by an examination of our buses, and a talk with our representatives.

For further study and reflection there is a beautifully illustrated booklet—"A Fifth Avenue Transportation System for Any Community."

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FIFTH AVENUE COACH CO.
New York, N.Y.

Ready for you!

August, 1923, Edition

McGRAW
Electric Railway Directory

with NEW FEATURES

New Listing of Holding Companies
(cross indexed)

New indexing to show what lines connect any cities or towns in which you are likely to be interested.

New data regarding number of buses owned.

List of bus lines controlled by electric railways.

plus

1. A complete list showing the correct name of every recorded electric railway company in the United States, Canada, Mexico and the West Indies, arranged by States and Cities.
2. Address of each company.
3. Names of affiliated and controlling corporations.
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5. Names and addresses of corporation officers and principal department heads, including purchasing agents.
6. Names and addresses of holding or controlling companies and lists of properties controlled by each.
7. Names and addresses of consulting engineers, if any.
8. Addresses of power plants and repair shops.
9. Number and make of generators, starting capacity, voltage, whether d.c. or a.c., and if a.c., phase and cycles.
10. If water power is used, horsepower and make of prime movers.
11. If steam power is used, horsepower and make of boilers and engines.
12. If gas or oil engines are used, horsepower and make.
13. Transmission voltage.
14. Trolley voltage.
15. If energy is purchased, from whom.
16. Number and capacity of sub-stations, number of rotary converters and motor generator sets used.
17. Amusement parks reached, whether owned or controlled by company.
18. Mileage of the road, owned, leased and trackage rights.
19. Miles in paved streets.
20. Gage of track.
21. Number and kind of rolling stock used.

*22. Number of one-man cars.

*23. Rate of fares.

24. Doing a lighting business.
25. Date of latest information.
26. Names, officers and executive committees of Electrical Railway Associations, arranged alphabetically by name.
27. Names, commissioners and principal assistants of National and State Railroad and Public Utility Commissions, arranged alphabetically by States.
28. Statistics showing growth of the industry.
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Galena Service is at your command. Its exceptional facilities for practical cooperation will be of valuable assistance in securing a lubrication standard that will result in increased operating efficiency.

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Call at the Galena booth. Meet our representatives and talk over the possibilities of Galena Service. Will be glad to see you.

Lubricants that are demonstrating their matchless efficiency and economy on hundreds of Electric Railways.

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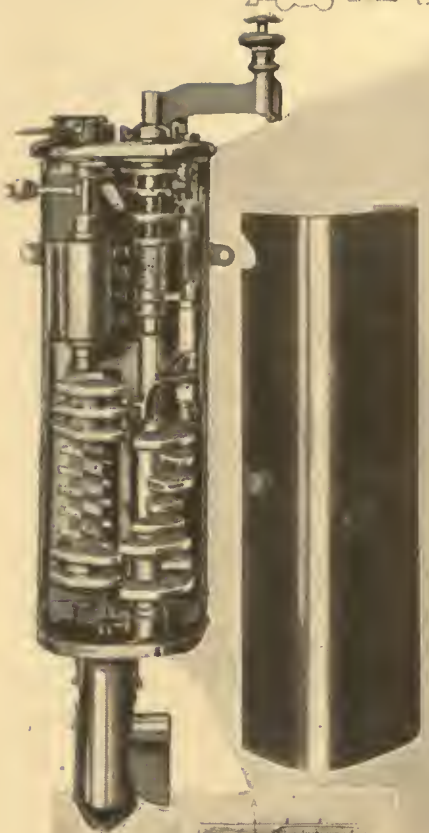
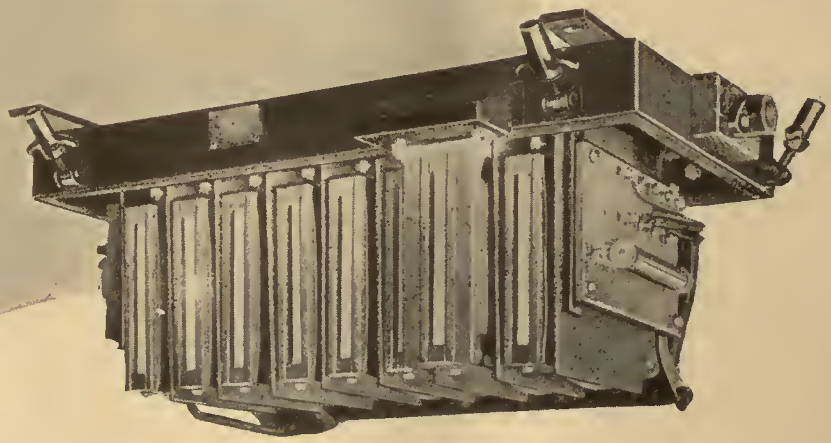
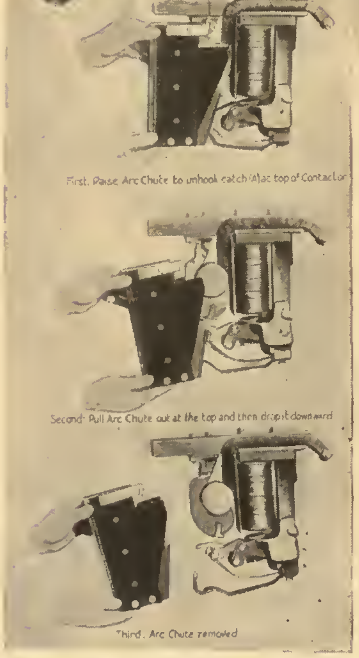
LIGHT WEIGHT






A
First, Raise Arc Chute to unhook catch (A) at top of Contactor
Second: Pull Arc Chute out at the top and then drop it downward
Third: Arc Chute removed

Showing the removal of arc chute without tools

Light-Weight "M" Control

The light-weight type "M" Control is of particular interest to operators who contemplate train operation of modern light-weight cars.

This Control incorporates all the desirable features which have made type "M" so successful, and in addition, has all the modern improvements, such as, auxiliary arcing horns, arc suppressor plates, and removable arc chutes.

The total weight of the complete equipment is 1400 lb.

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To obtain uniformly excellent results from standard railway motors with slotted commutators on both city and interurban service

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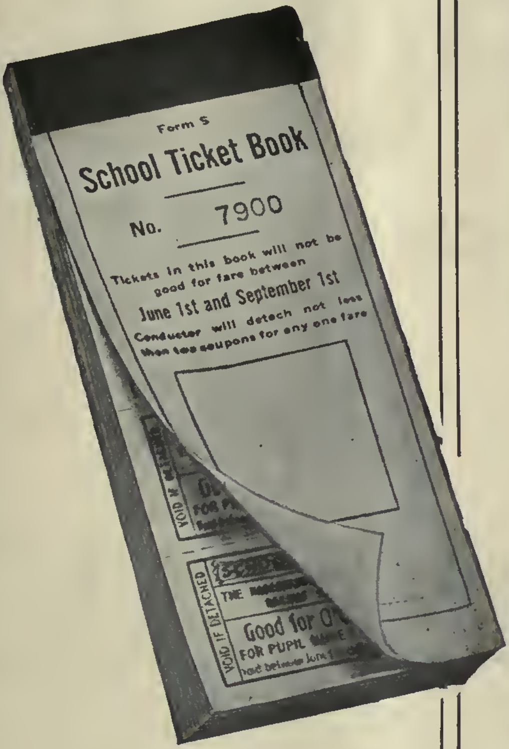
Form 5
School Ticket Book
No. 7900
Tickets in this book will not be good for fare between June 1st and September 1st
Conductor will detach not less than two coupons for any one fare
VOID IF DETACHED
Good for One
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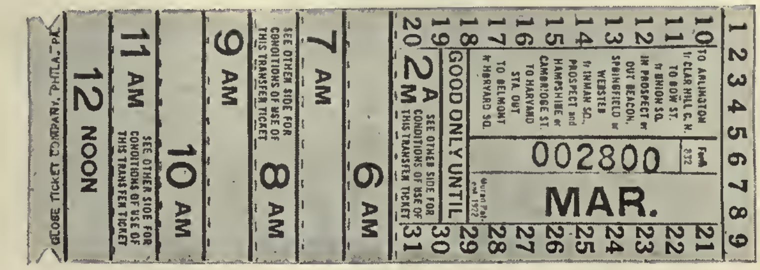

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Tickets—Weekly Passes—Transfers

These and other styles of Globe Tickets are helping many Electric Railway Operators to get by rush hours with the least possible confusion.

Included with the "other styles" of Globe Tickets are Cash Fare Receipts. Do you use them?

When the ticket problem is a big one, that must be settled, tell us your troubles, We will be glad to help you out.

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Winter is just ahead—

Eliminate brush troubles with

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the new Stackpole brush for traction motors, both ventilated and enclosed types. Nothing counts like performance. And Grade L-30 brushes establish facts. Facts that prove economical brush service under the hardest conditions. Place a trial order now.

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Low specific resistance, greater carrying capacity, longer life and minimum ring-wearing qualities are their features. Do not fail to check up on these brushes. Tests have proven them exceptional.

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in every city and town in the United States

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Installed with Allis-Chalmers products, in the Company's large plant at Milwaukee, are eleven Edge Moor Boilers, furnishing the steam for the manufacture of other Allis-Chalmers equipment.

Purchased over a period of eighteen years, these eleven boilers represent five separate orders. The efficient performance of the first Edge Moors was responsible for subsequent orders.

In scores of industries, users of power, large and small, find in the Edge Moor Boiler the solution of their steam generation problems. Complete information is given in the Edge Moor Catalogue, a copy of which will be promptly sent at your request.

Ten Edge Moor Boilers totaling 6643 H. P. in the Allis-Chalmers plant at West Allis, near Milwaukee, Wis.

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Established 1868
EDGE MOOR, DELAWARE

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FOR INCREASED FUEL ECONOMY

Kalamazoo

trolley wheels and harps

THE VERY FACT that Kalamazoo Trolley Harps and Wheels are made by the largest concern of its kind in the World is in itself an indication of their standard.

Our products are made in a shop devoted exclusively to these specialties. Today we are supplying the major part of the entire demand of the United States. There must be a reason for this, and there *is*. And that is, a high reputation due to high quality.

Kalamazoo Trolley Harps and Wheels have been endorsed by the leading electric roads since their inception on the market, over 25 years ago.

Kalamazoo wheels are made of virgin metal—pure lake copper—they are of proper design for the intended service, and are honestly manufactured.

Kalamazoo Harps give perfect and continuous contact, and are designed to permit easy replacement of wheels. There is only one cotter pin to be taken out to remove the wheel.

They are balanced for easy running and freedom from slippage. They do not wear down and damage the wire, for wire life is more important than wheel life.

STAR BRASS WORKS

Kalamazoo, Michigan

The largest exclusive manufacturers of trolley wheels in the world

Have you noticed ?

Any time, anyone, before any convention, has ever bragged of fine pinion records – the pinions always happen to be

Cincinnati "Tool Steel" ?

And yet we are told other pinions are "just as good"!

Tool Steel Quality

The Tool Steel
Gear and Pinion Co.
CINCINNATI, O.

For the long pull
and the strong pull;
the short pull,
and the sharp pull—

BOYERIZE!

“It’s BOYERIZED”

A buzz—a slight hiss of air—and the great car comes to a smooth stop. Or a sudden jerk at the air control, and she stops almost instantly, with a grind and a jar.

In any case the strain on the brake rigging is terriffic. Only specially hardened steel can live at all—only Boyerized steel with its glossy armor plate surface can give full service and protection.

You may smile, but experience has proved that it outwears case-hardened steel *three to four times.*

The McArthur Turnbuckle

You won’t have to refit the brake rigging with new turnbuckles, if you specify McArthur Turnbuckles in the first place. They will last as long as the truck itself.

More than that—the old-style jam-nut idea has been scrapped, and an efficient spring-equipped split-clamp principle has been substituted. Now it only takes a pocket-wrench and a moment’s time to make an adjustment, and tighten it up to *stay.*

Other Boyerized Products Include

Brake Pins
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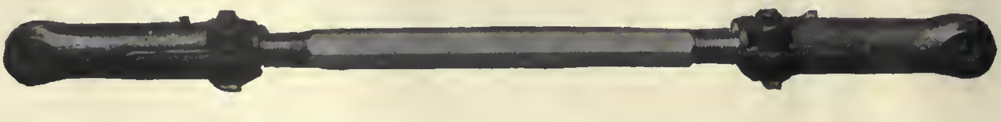
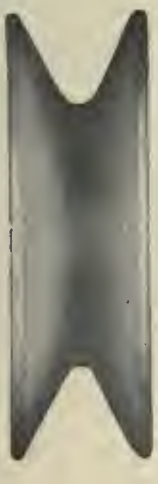


BAYONET

Boyonet Trolley Harp



Bayonet Trolley Wheel

Detachable Harp

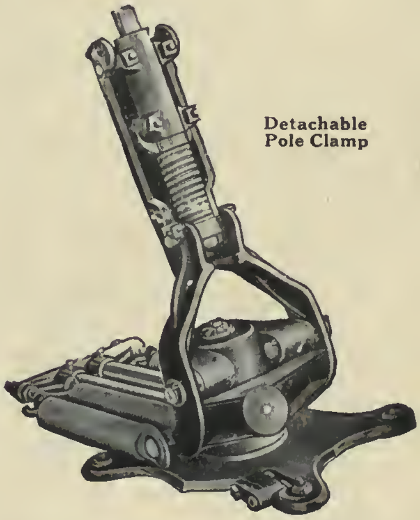
10 seconds to change a harp and wheel!

and the car goes on its way

Maintenance methods are made easier and cheaper with Bayonet equipment.

Quick detachable features enable your men to replace a defective wheel or harp in ten seconds by the watch—then repairs are made at the bench, while the car goes on its way. An entire pole can be replaced in 30 seconds.

Finest workmanship along designs which have been proved correct, affords longest life, utmost satisfaction and lowest costs when Bayonet Trolley Equipment is adopted as standard.



Detachable Pole Clamp

Bayonet Trolley Base

BAYONET TROLLEY HARP COMPANY
Springfield, Ohio, U. S. A.

TROLLEY EQUIPMENT

520 NEW CARS

in Philadelphia

And every one equipped with

CARNEGIE
Wrought Steel Wheels and Heat-Treated Axles

Carnegie Steel Company is prepared to meet *your* requirements for efficient wheel and axle service. 'Carnegie' equipped means Satisfactory Service.

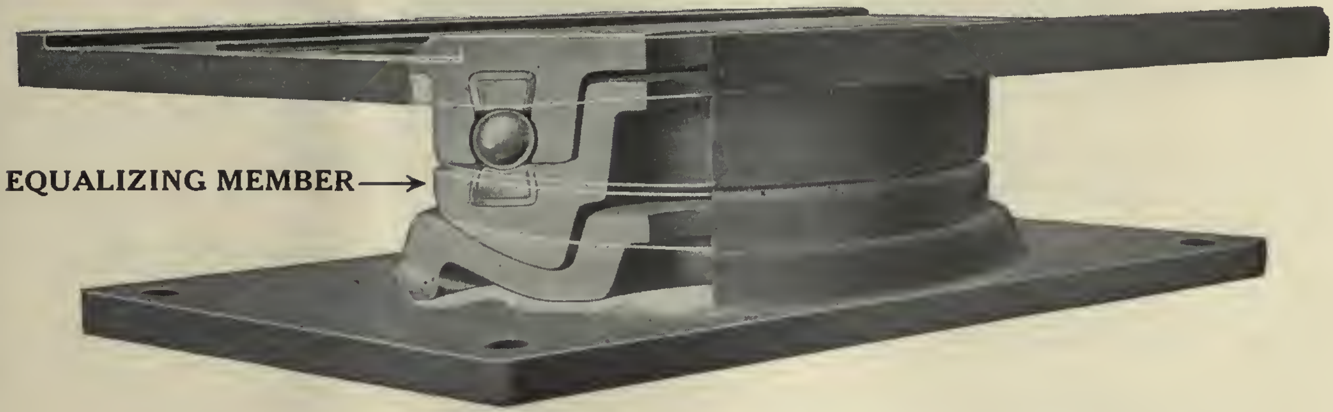
Carnegie Steel Company

GENERAL OFFICES — CARNEGIE BUILDING 434 FIFTH AVENUE — PITTSBURGH, PA.

1647

SYMINGTON

BALL BEARING
EQUALIZING CENTER PLATE



The intermediate equalizing member gives to each ball its proportion of the full load. This member is free to move in a limited arc and compensates for tilting of bolsters in any direction. There is no possibility of concentrated loading and crushing the balls or pocketing the race plates

Reduces Maintenance
Increases Safety

TO permit the truck to turn in rounding curves is one function of the center plate.

Quick recovery to straight line-up on tangent track is equally important.

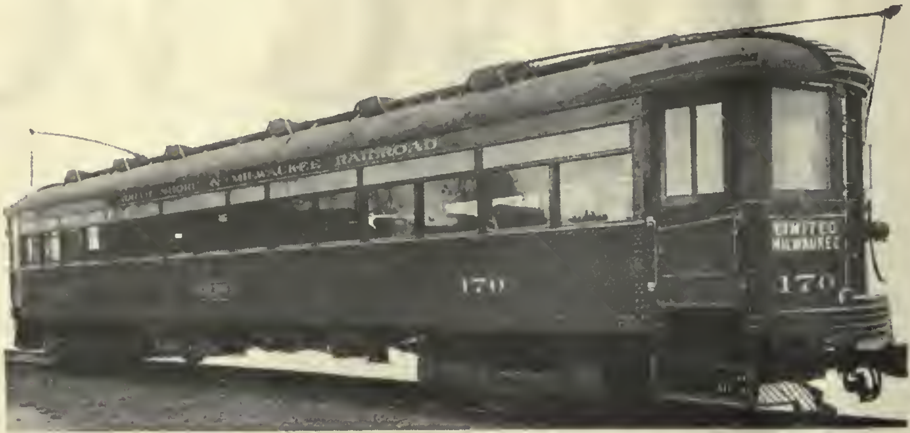
Symington Ball Bearing *Equalizing* Center Plates provide low resistance to turning on curves and insure quick line up of trucks on tangent track.

They reduce wheel flange wear, reduce frequency of tire turning, and increase safety by preventing derailments.

Symington Ball Bearing *Equalizing* Center Plates are an important factor in safe, economical car operation.

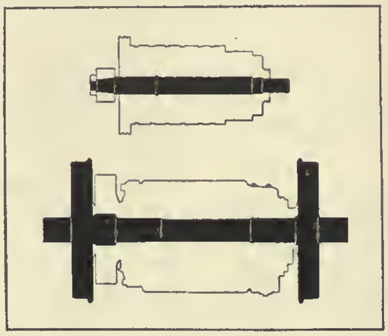
THE T. H. SYMINGTON COMPANY

New York Chicago Baltimore Boston Montreal
WORKS: ROCHESTER, N. Y.



Type of Car Used by the Chicago North Shore and Milwaukee R. R.

Length over all	55 ft.—3¼ in.
Width over side sheeting	8 ft.—8 in.
Weight of Motor Car (No passengers)	90,000 to 100,000 lbs
Weight of Trailer Car (No passengers)	79,000 lbs.
Seating Capacity	54 to 56
Number in service as of May 1, 1923	45 Motors 15 Trailers
Number under construction as of May 1, 1923	18 Motors 2 Trailers
Number of motors per motor car	4
Type of Motor	Westinghouse 557-R-1



Wheels **Armature Shafts** **Motor Axles**

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES

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HOUSTON, TEXAS
PORTLAND, ORE.
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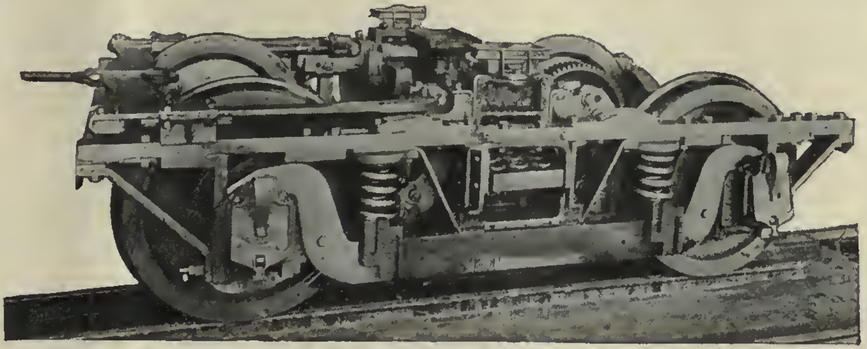
PITTSBURG, PA.
MEXICO CITY, MEX.

WORKS: BURNHAM, PA.

BALDWIN



Motor Truck for Northwestern Elevated Railroad Company, Chicago

More than ninety years experience in the building of railroad motive power is in back of Baldwin Electric Motor Trucks

AN electric motor truck is practically a locomotive, and should be designed and built with equal skill and care.

In addition to transmitting the propelling power from the motors to the rails, a motor truck must carry the weight of the car body and load (which is exceedingly variable) and also provide first-class riding qualities under all conditions of loading and over a wide range of speeds.

Furthermore, on account of such factors as sharp curves, rapid acceleration and heavy brake applications, the service conditions are severe and ample strength of all parts to meet heavy stresses is essential.

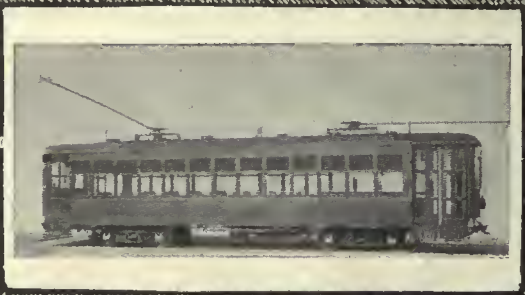
Baldwin Locomotive-Built Trucks are backed by over 90-years experience in building railroad motive power. Commercial shapes are largely used in their construction, so repairs may be easily made. The Baldwin designs cover practically all the requirements of electric railway service, from the short street car line operating at moderate speeds, to the interurban line where heavy "limited" cars are run at maximum speeds of 70 or 80 miles per hour.

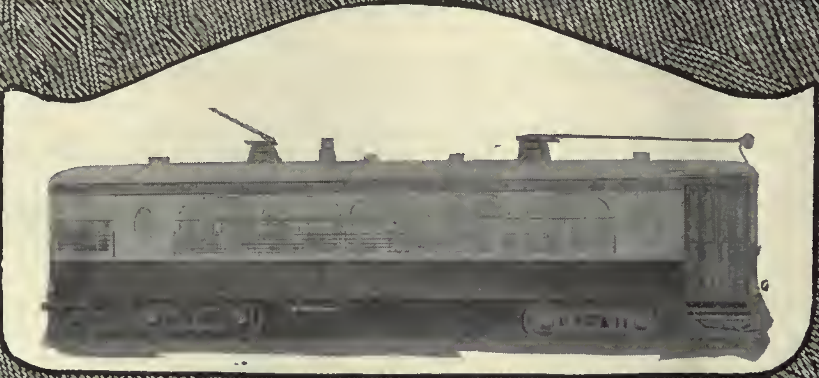
Every user of electric motor and trailer trucks should have our catalogs giving detailed information.

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

MOTOR TRUCKS

St. Louis
Quality Cars





In Your Convention Report to Your Board of Directors

include your recommendations as to the desirability of further investigating the developments made by the St. Louis Car Company in lightweight, one-man, double-truck safety cars for city or interurban service.

We will gladly furnish you for your report, photographs and data on the striking jobs we have turned out for other railways during the past few months.

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"

CYPRESS
"The Wood Eternal"

gives insurance against a continuous big *labor cost* for renewals and replacements in the many railway uses for lumber.

When you specify and use

All Heart Cypress for Ties, Fencing, Trunking Capping, Etc.,

you know it will give longer service than any other material. You know, too, how labor costs exceed material costs in almost every case. Of course even Cypress may eventually have to be replaced. Nothing lasts quite "forever." But in the long service-life you get from all-heart Cypress you will have *saved* a lot of labor costs in *maintenance alone.*

Anyway, that's why a number of the biggest railways in the country *insist* on All-Heart Cypress.

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TRADE MARK REG. U.S. PAT. OFFICE

"*Buy by the Cypress Arrow.*" Look for this mark on the end of every piece—or on every bundle. Our data is at your service.

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1265 Poydras Building, New Orleans, La., or
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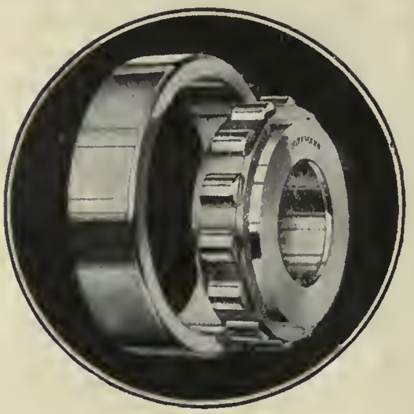
HOFFMANN

PRECISION ROLLER BEARINGS



For Heavy Loads and Hard Service; Standard and Self-Aligning Types

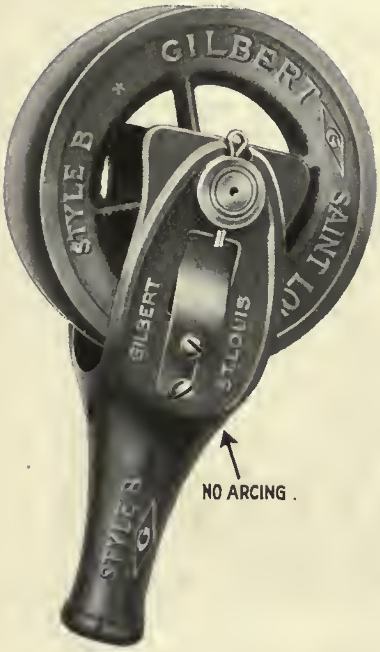
Heavy-duty units built to the highest standards of precision; affording maximum serviceability under conditions involving heavy loads, temporary overloads, shocks, jars and vibrations; offering new opportunities for power saving and reduced upkeep costs.

Our engineers will welcome an opportunity to work with yours, in the application of these high-duty, high-precision bearings to electric railway machinery, with a view to securing maximum anti-friction efficiency, minimum maintenance costs, and continuity of service.

THE NORMA COMPANY
OF AMERICA
Anable Avenue
Long Island City New York
MAKERS OF "NORMA" PRECISION BALL BEARINGS

More Miles Per Dollar

That Is What You Get When Your Order Calls for



our style B Wheel and Harp with 7/8 hollow pin for graphite grease.

Best service performance consistent with wear on overhead.

We make wheels to fit all standard harps.

Armature Bearings

made from our Velox Bronze and lined with our "C" grade Nickel Babbitt, mean—

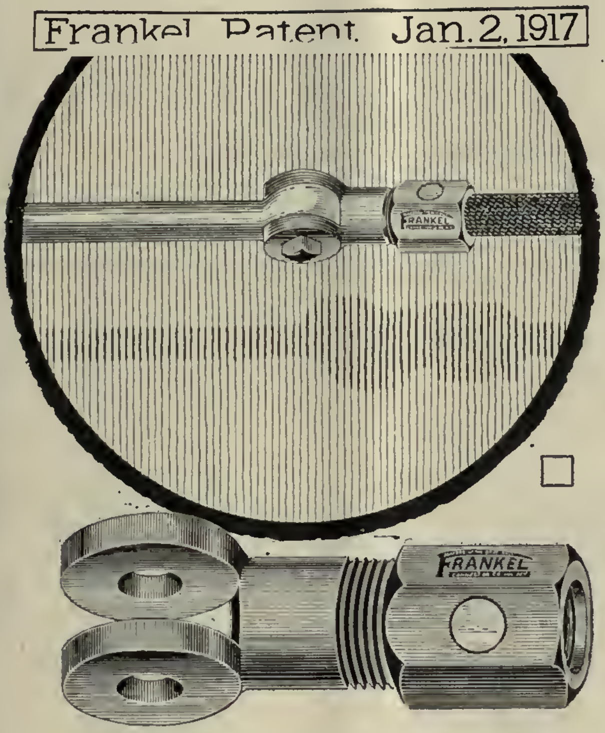
SERVICE PLUS SATISFACTION
TO YOU

MORE BUSINESS FOR US.

LET'S GET TOGETHER

A. GILBERT & SONS BRASS FOUNDRY CO.

ST. LOUIS, U. S. A.



Frankel
SOLDERLESS
CABLE ANCHORS

A STRAIN insulator—bolted to the clevis—and the cable connected to the —Frankel solderless connector—that's an anchor you can make in a couple of minutes.

And from the simplicity you can see why experienced high cost labor isn't needed.

Those are but two items that illustrate the economy in using Frankel connectors.

More important, however, is the fact that in addition to the economy you get a far better Job—without destroying the cable or the insulation as is the case where heat is employed, and where conductivity is a factor at a joint—you get better conductivity than the wire itself in a Frankel connection.

For Further Particulars, Address

Westinghouse Electric & Mfg. Co.
or
Western Electric Company

Frankel
Solderless Connectors

Offices in all principal cities

Safeguard Your Highway Crossings With NACHOD SIGNALS

One of the 13 Nachod Crossing Signals on the line of the Interstate Public Service Company, Indianapolis, Indiana.

They give an arrestive warning at the highway against the approach of your interurban trains by loud ringing bell and flashing red lights. Before he reaches the crossing they give the motorman a special indication that he has started the bell ringing. Made also with swinging wig-wag. Operated entirely from trolley power, and at the highest possible car speeds. Their cost is but little—and by their insistent warning they save damage suits and expensive litigation.

Install Nachod Highway Crossing Signals and sleep sounder o'nights. Get your copy of Catalog 720 telling all about them.

Remember Nachod Spells Safety!

Nachod Signal Company, Inc.
4777 Louisville Ave., Louisville, Ky.

Also manufacturers of Block Signals, Automatic Headway Recorders.

Twofold Appreciation

You will appreciate Perley A. Thomas cars because of their economy and practical design.

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Cars of all types

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BIRNEY One-Man SAFETY

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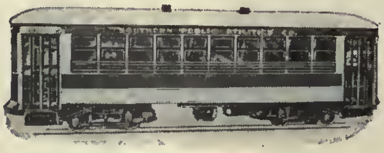
Large City and Interurban

Specializing in .

Sash; Doors; Interior Finish; Framing; Curtains; Ventilators; Car Trimmings; Brakes; Gongs; Door and Step Mechanism.

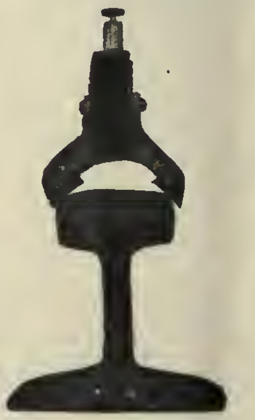
"SAFETY FIRST"



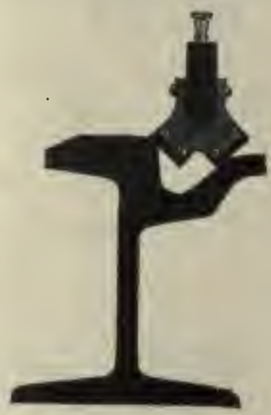
Perley A. Thomas Car Works
High Point, N. C.

Bond Tester in Use, and Scale

ROLLER-SMITH
Bond-Tester



Bar in place on "T" Rail Showing Saw Blade Contact



Bar in Place on "Girder" Rail Showing Saw Blade Contact

Practical — Simple — Accurate

It meets *all* the requirements of a satisfactory bond testing device. The man of moderate skill can manipulate it correctly. It is small, compact, light, portable, rugged and absolutely dependable. Its extensive use by the larger railways is sufficient proof of its accuracy and economy. Bulletin G-200 is the one to send for.

Bulletin G-201 describes a light, compact Portable Storage Battery Outfit for use where the current in the rail is small, intermittent, or entirely absent, and an external source of current is required.

Write for these Bulletins today.

ROLLER-SMITH COMPANY
Electrical Instruments, Meters and Circuit Breakers

2128 Woolworth Bldg.
NEW YORK

Works
BETHLEHEM, PA.

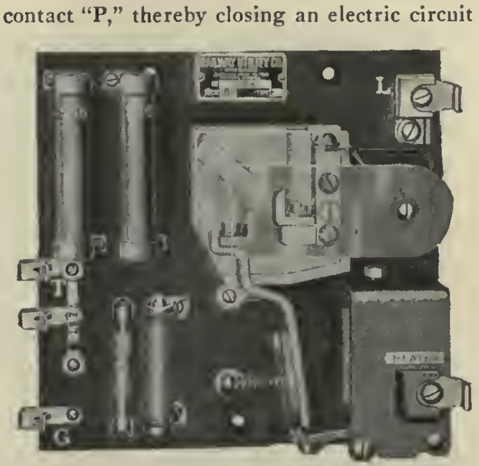
Offices in Principal Cities in U. S. and Canada

Utility New Type No. 8 Heat Regulator—

The Last Word in Thermostatic Control of Electric Heaters

The new method of mounting our Thermostats renders them absolutely shock and tamper-proof. Using a soft rubber bushing at the top of the mercury tube and holding the bushing in a loose-fitting clamp give it the flexibility necessary to prevent the separation of the mercury column ordinarily occasioned by vibration of the car or shock through tampering by the crews. We have also added a spring contact "S C" and a permanent contact "P," as shown in illustration. Should the mercury tube be broken from shock or vibration, the spring contact "S C" will engage permanent contact "P," thereby closing an electric circuit that cuts off the heat.

IN THE NEW NO. 8 SWITCH, shown in illustration at right, we have eliminated the use of a Relay and have substituted an Eliminator, which takes the place of the Relay, so that the only movable part in the whole equipment is the main contactor, which cuts the heat in and out. We have also designed an Applicator, to take the place of Relays on any switches heretofore furnished by us, with complete instructions for making the change.



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Holders

—are built to withstand
long and hard service.

COLUMBIA 1892 MACHINE WORKS

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IRVING SUBWAY TRADE MARK (PATENTED)
THE FIREPROOF VENTILATING FLOORING

A Wear-Proof Safety Step

IRVING SAFSTEP TRADE MARK (PATENTED) REG. U.S. PAT. OFF.

ABSOLUTELY NON-SLIPPING ALWAYS

Strips of steel, riveted edge-on in a solid panel—that's what the **Safstep** is. There's nothing about it to wear out—no lead strips or abrasive inserts to work loose, need replacement, and maybe cause trouble. And wear does not destroy the foot-gripping, non-slipping qualities of the **Safstep**—it is safe first and last, in all weathers, all the time. There's a size and style for your equipment. Write for Catalog 3A28.

IRVING IRON WORKS CO.
LONG ISLAND CITY. N.Y., U.S.A.

MANUFACTURERS OF

IRVING SUBWAY TRADE MARK (PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING

ALLIS-CHALMERS

Type "C"

Engineers Valves for Air Brakes

This engineer's valve has been adopted by many important railways as STANDARD, regardless of the other equipment used. Several years of commercial application has demonstrated type "C" Engineer's Valve to be superior in every respect. A few important features are graduated application positively secured at service point—quick emergency point—graduated release, if desired—very quick release at full release point—no ground joints—simple design—valve can be completely dismantled and reassembled in two minutes by removing only two nuts—etc., etc.

500,000 service applications and releases at 90 lbs. pressure show no wear on the parts.

Send for Bulletin No. 1103A.

ALLIS-CHALMERS
MANUFACTURING COMPANY
MILWAUKEE, WISCONSIN. U.S.A.

Note that the contact surface is in straight line with the wire hole in this

DOSSERT
SPECIAL
Front Connected
LUG
(Solderless)

This type of lug is specially adapted for terminals such as connecting large cables to storage batteries, etc. It emphasizes the adaptability of the Dossert line to special classes of work.

Are you familiar with the different types shown in the 15th year book?

GET THIS BOOK

FREE

Dossert & Co.
242 West 41st Street
New York, N. Y.

STANDARD

WIRES, CABLES AND CABLE ACCESSORIES
Manufactured by STANDARD UNDERGROUND CABLE CO.
Boston, New York, Philadelphia, Washington, Pittsburgh, Chicago, Detroit, St. Louis, San Francisco

AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches

Albert & J. M. Anderson Mfg. Co.
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Established 1877
Branches—New York, 135 B'way
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Shaw Lightning Arresters

Standard in the Electric Industries
for 35 years

Henry M. Shaw

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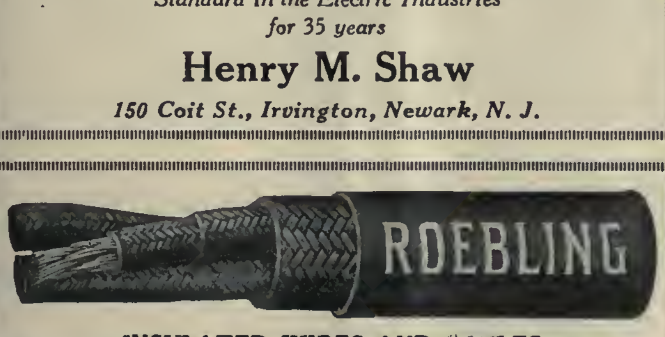

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We solicit your inquiries

Creosoting Plant located
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BARE COPPER WIRE AND CABLE
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Lapp Insulator Co. Inc. LeRoy, N.Y.
Trade Mark

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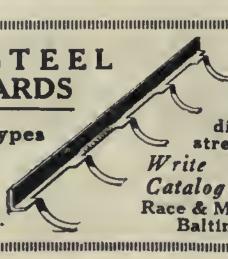
PAVING GUARDS

Adapted to all types of rails and paving.

W. S. GODWIN CO., Inc.



Proven by service to economically prevent seepage and disintegration of street railway paving.

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UNITED STATES
TWIN TERMINAL
SOLDER
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Arc Weld and Flame Weld

*Send for new
Rail Bond Book*

American Steel & Wire Company
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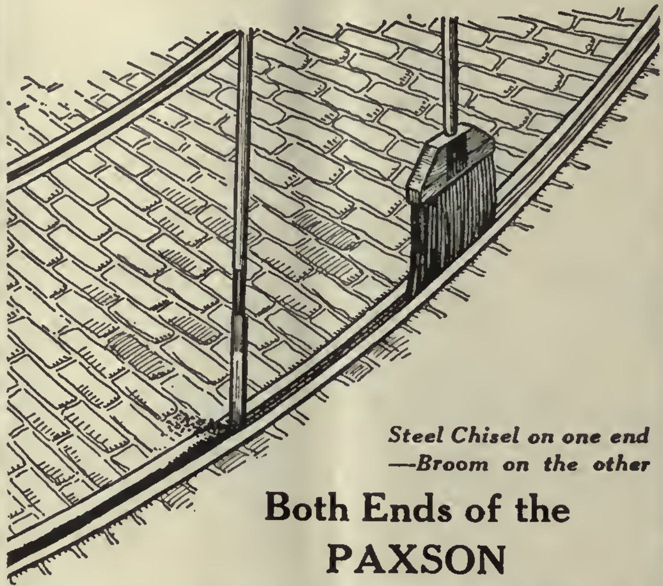
GET OUT, DIRT!



*Steel Chisel on one end
—Broom on the other*

Both Ends of the
PAXSON
Track Broom are *Business* Ends

—for which reason they have been the choice of railway men for 25 years.

Made of flat steel spring wire. Fits frogs, switches and grooves. Has strong ash handle with steel chisel on other end. Broom is light in weight but strong in construction. Send for a sample—you will be pleased.

J. W. PAXSON CO.
Manufacturers
Nicetown Lane and D St., Philadelphia, Pa.

High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

New York Switch & Crossing Co.
Hoboken, N. J.

DUNDEE "A" AND "B" FRICTION TAPES

Great Adhesive Strength
High Quality
Long Life
Price Right

Write for Samples and Circulars

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Sales Offices: New York—Atlanta—San Francisco
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Automatic Signals

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RAMAPO AJAX CORPORATION

Ramapo Automatic Return Switch Stands for Passing Sidings

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RACOR Tee Rail Special Work.

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U. S. ELECTRIC AUTOMATIC SIGNAL

for single track block signal protection

United States Electric Signal Co.
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ESTABLISHED 1881

Special Track Equipment and Layouts of all kinds

THE BUDA COMPANY
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BUCKEYE JACKS

high-grade R. R. Track and Car Jacks

The Buckeye Jack Mfg. Co.
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A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

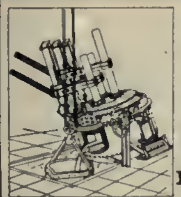
BARBOUR-STOCKWELL CO.
205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of

Special Work for Street Railways

Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED



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Ten Standard Sizes 1/16 to 24 Tons Capacity
Most Rapid and efficient for making
Tool Steels, Alloy Steels, Forging Steels
Steel Castings, Malleable Iron, Grey Iron
Carbide, Ferro-Alloys etc.
PITTSBURGH ELECTRIC FURNACE CORPORATION
P.O. Box 1125. PITTSBURGH, PA.

"Make it of Vul-Cot Fibre"

NATIONAL VULCANIZED FIBRE CO.
WILMINGTON DELAWARE

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK

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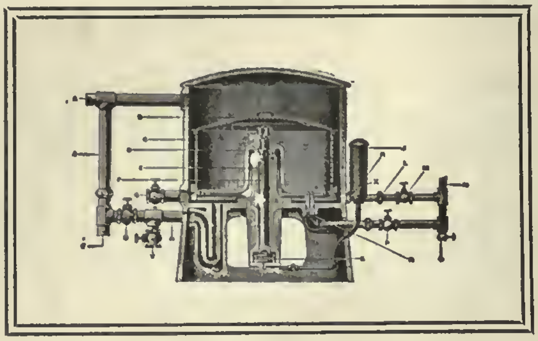

Reclaim Dollars—
By converting oily waste into oil and waste

There are many gallons of good lubricant—many pounds of good waste—in that oily pile. It needs but the installation of this simple, efficient machine to effect the change from oily waste to oil and waste. Electric Railroads throughout the country are reaping the benefit of its sound economy in lower maintenance costs.

Write us for full details—now.

OIL & WASTE SAVING MACHINE CO.
Philadelphia, Pa.

FORD
TRIBLOC
Look for the Green LoopGuide

A speedy and highly efficient chain hoist. Built in capacities from ¼ to 20 tons. Write for Catalog 5-B containing complete information.

FORD CHAIN BLOCK CO.
2nd and Diamond Sts., Philadelphia, Pa.
Over eas Representative: Allied Machinery Company of America, 51 Chambers Street, New York, N. Y.

2234-D

CHAIN HOISTS

TULC
A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio

CLEVELAND
FARE BOXES
always
Fit the Fare and Fare Collection System
The Cleveland Fare Box Co.
Cleveland, Ohio
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Gets Every Fare
PEREY TURNSTILES or PASSIMETERS
Use them in your Prepayment Areas and Street Cars
Perey Manufacturing Co., Inc.
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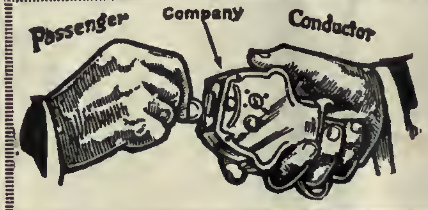
SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

Heywood-Wakefield
CAR SEATS
of pressed Steel for all Classes of Passenger Service. Rattan for covering seats and for snow sweepers.
HEYWOOD-WAKEFIELD CO.
Factory at Wakefield, Mass.
Offices at New York, Chicago, San Francisco

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition



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By the Passengers
Rooke Automatic Register Co.
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doesn't apply to machinery

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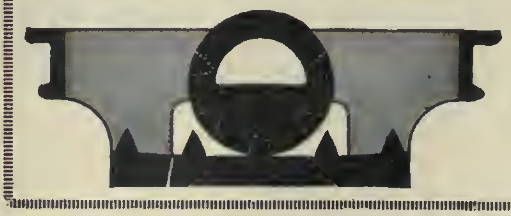

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LEGAL NOTICE

STATEMENT OF THE OWNERSHIP,
MANAGEMENT, CIRCULATION,
ETC., REQUIRED BY THE
ACT OF CONGRESS OF
AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for Oct. 1, 1923.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James H. McGraw, Jr., who having been duly sworn according to law, deposes and says that he is the Secretary of McGraw-Hill Company, Inc., Publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Company, Inc., 10th Ave. and 36th St., New York. Editors, H. W. Blake, and H. L. Brown, 10th Ave. and 36th St., New York. Managing Editor, none. Business Manager, David Cameron, 10th Ave. and 36th St., New York.

2. That the owner is: (If the publication is owned by an individual his name and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent or more of the total amount of stock should be given.) McGraw-Hill Company, Inc., 10th Ave. at 36th St., New York, N. Y. James H. McGraw, 10th Ave. at 36th St., New York, N. Y. Arthur J. Baldwin, 10th Ave. at 36th St., New York, N. Y. Henry W. Blake, 10th Ave. at 36th St., New York, N. Y. Fred R. Low, 10th Ave. at 36th St., New York. Leonard D. Baldwin, 27 Pine Street, New York City. James H. McGraw and James H. McGraw, Jr., 10th Ave. at 36th St., New York, N. Y., Trustees for Harold W. McGraw, James H. McGraw, Jr., Curtis W. McGraw, Donald C. McGraw. Essex Co. Trust Co. et al., East Orange, N. J., Trustee for Estate of John A. Hill. Leonard D. Baldwin and Arthur J. Baldwin, 27 Pine St., New York City, Trustees for Donald Baldwin, Grace Riker, Franklin Baldwin, Cynthia Hazelton. Malcolm Muir, 10th Ave. at 36th St., New York, N. Y., Trustee for Lida K. Muir. Grace W. Mehren, 53 Fairview Ave., So. Orange, N. J. Curtis W. McGraw, 370 Seventh Ave., New York, N. Y. Donald C. McGraw, 10th Ave. at 36th St., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

JAMES H. McGRAW, JR.

Sworn to and subscribed before me this 28th day of September, 1923.

[Seal.] MARTIN J. WIEMER.

Notary Public Kings County Certificate No. 27. Certificate filed in New York County No. 44.
(My commission expires March 30, 1924.)

Why Electric Railway Men Should Be Readers of BUS TRANSPORTATION

From an Editorial in Electric Railway Journal, September 8, 1923

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Send your orders to us and deduct 20 per cent from the current quotations.

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50-Ton Electric LOCOMOTIVE

600 Volt—D. C.

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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
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- **Air Circuit Breakers**
  - Roller-Smith Co.
- **Air Receivers, Aftercoolers**
  - Ingersoll-Rand Co.
- **Ammeters**
  - Roller-Smith Co.
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  - Westinghouse E. & M. Co.
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  - Elec. Service Supplies Co.
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  - Ramapo Ajax Corp.
- **Automatic Safety Switch Stands**
  - Ramapo Ajax Corp.
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  - Standard Steel Works Co.
- **Axles, Car Wheel**
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  - Bethlehem Steel Co.
  - Brill Co., The J. G.
  - Carnegie Steel Co.
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  - Columbia M. W. & M. I. Co.
- **Babbitt Metal**
  - Ajax Metal Co.
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  - Elec. Service Supplies Co.
  - Internat'l Register Co., The
- **Batteries, Dry**
  - National Carbon Co.
- **Bearings and Bearing Meatals**
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  - Bemis Car Truck Co.
  - Columbia M. W. & M. I. Co.
  - General Electric Co.
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  - More-Jones Brass & Metal Co.
  - Westinghouse E. & M. Co.
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  - Baldwin Locomotive Wks.
  - Stucki Co., A.
- **Bearings, Roller**
  - Norma Co. of America
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  - Columbia M. W. & M. I. Co.
  - Consolidated Car-Heating Co.
  - Elec. Service Supplies Co.
  - Western Elec. Co.
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  - Babcock & Wilcox Co.
  - Edge Moor Iron Co.
- **Boiler Tubes**
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  - Elec. Ry. Imp. Co.
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  - Elec. Ry. Imp. Co.
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  - General Electric Co.
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  - Ohio Brass Co.
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  - Western Elec. Co.
  - Westinghouse E. & M. Co.
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  - Roller-Smith Co.
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  - Elec. Ry. Improvement Co.
  - Elec. Service Supplies Co.
  - Hubbard & Co.
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  - Western Elec. Co.
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  - Brill Co., The J. G.
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  - Brill Co., The J. G.
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  - National Brake Co.
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  - Westinghouse Tr. Br. Co.
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  - Wason Mfg. Co.
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- **Castings, Gray Iron and Steel**
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  - Columbia M. W. & M. I. Co.
  - Standard Steel Wks. Co.
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  - Bemis Car Truck Co.
  - Columbia M. W. & M. I. Co.
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  - Hubbard & Co.
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  - Westinghouse E. & M. Co.
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  - General Electric Co.
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  - Economy Elec. Devices Co.
  - Elec. Service Supplies Co.
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  - General Electric Co.
- **Coils, Choke and Kicking**
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  - Westinghouse E. & M. Co.
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  - Elec. Service Supplies Co.
  - Internat'l Register Co., The
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  - Cleveland Fare Box Co.
- **Coin Wrapping Machines**
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  - General Electric Co.
  - Westinghouse E. & M. Co.
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  - General Electric Co.
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  - Cameron Elec'l Mfg. Co.
  - Columbia M. W. & M. I. Co.
  - Westinghouse E. & M. Co.
- **Compressors, Air**
  - Allis-Chalmers Mfg. Co.
  - General Electric Co.
  - Ingersoll-Rand Co.
  - Western Elec. Co.
  - Westinghouse Tr. Br. Co.
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  - Ingersoll-Rand Co.
- **Condensers**
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  - General Electric Co.
  - Ingersoll-Rand Co.
  - Westinghouse E. & M. Co.
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  - Irvington Varnish & Ins. Co.
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  - Dossert & Co.
  - Frankel Connector Co.
  - Westinghouse E. & M. Co.
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  - General Electric Co.
  - Westinghouse E. & M. Co.
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  - Westinghouse E. & M. Co.
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  - Allis-Chalmers Mfg. Co.
  - General Electric Co.
  - Westinghouse E. & M. Co.
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  - Anaconda Copper Min. Co.
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  - National Vulcanized Fibre Co.
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  - Elec. Service Supplies Co.
  - Internat'l Register Co., The
  - Roebling's Sons Co., J. A.
  - Samson Cordage Works
  - Silver Lake Company
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  - Samson Cordage Works
  - Wood. Co., Chas. N.
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  - Ohio Brass Co.
  - Westinghouse Tr. Br. Co.
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  - Ramapo Ajax Corp.
- **Crossing Foundations**
  - International Steel Tie Co.
- **Crossing Frog and Switch**
  - Ramapo Ajax Corp.
  - Wharton, Jr., & Co., Wm.
- **Crossing, Manganese**
  - Bethlehem Steel Co.
  - Indianaolis Switch & Frog Co.
  - Ramapo Ajax Corp.
- **Crossings Track (See Track, Special Work)**
- **Crossings, Trolley**
  - Ohio Brass Co.
- **Crushers, Rock**
  - Allis-Chalmers Mfg. Co.
- **Curtains and Curtain Fixtures**
  - Brill Co., The J. G.
  - Elec. Service Supplies Co.
  - Morton Mfg. Co.
- **Dealers, Machinery**
  - Archer &Baldwin, Inc.
  - Buffalo Housewreck. Co.
  - Electric Equipment Co.
  - Lewis & Co., Henry
  - Transit Equipment Co.
- **Derailing Devices (See Track Work)**
- **Derailing Switches**
  - Ramapo Ajax Corp.
- **Destination Signs**
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  - Elec. Service Supplies Co.
- **Detective Service**
  - Wish Service, P. Edward
- **Door Operating Devices**
  - Consolidated Car-Heating Co.
  - Nat'l Pneumatic Co., Inc.
  - Safety Car Devices Co.
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  - Brill Co., The J. G.
  - General Electric Co.
  - Hale-Kilburn Co.
  - St. Louis Car Co.
- **Doors, Folding Vestibule**
  - Nat'l Pneumatic Co., Inc.
- **Draft Rigging (See Couplers)**
- **Drills, Rock**
  - Ingersoll-Rand Co.
- **Drills, Track**
  - American Steel & Wire Co.
  - Electric Service Sup. Co.
  - Ingersoll-Rand Co.
  - Ohio Brass Co.
- **Dryers, Sand**
  - Elec. Service Supplies Co.
- **Ears**
  - Ohio Brass Co.
- **Electrical Wires and Cables**
  - Amer. Electrical Works
  - American Steel & Wire Co.
  - Roebling's Sons Co., J. A.
  - Western Elec. Co.
- **Electric Grinders**
  - Railway Track-work Co.
- **Electrodes, Carbon**
  - Indianapolis Switch & Frog Co.
  - Railway Track-work Co.
- **Electrodes, Steel**
  - Indianapolis Switch & Frog Co.
  - Railway Track-work Co.
- **Enamels**
  - Beckwith-Chandler Co.
  - Glidden Co.
- **Engineers, Consulting, Contracting and Operating**
  - Allison & Co., J. R.
  - Archbold-Brady Co.
  - Arnold Co., The
  - Beeler, John A.
  - Bibbins, J. Rowland
  - Buchanan & Layng
  - Day & Zimmerman
  - Ford, Bacon & Davis
  - Hemphill & Wells
  - Holst, Englehardt W.
  - Jackson, Walter
  - Kelly Cooke Co.
  - Ong, Joe R.
  - Parsons, Klapp, Brinkerhoff & Douglas
  - Richey, Albert S.
  - Sanderson & Porter
  - Stevens & Wood, Inc.
  - Stone & Webster
  - White Engineering Corp., The J. G.
  - Wortham, Edwin
- **Engines, Gas, Oil or Steam**
  - Allis-Chalmers Mfg. Co.
  - Ingersoll-Rand Co.
  - Westinghouse E. & M. Co.
- **Fare Boxes**
  - Cleveland Fare Box Co.
  - National Ry. Appliance Co.
  - Ohmer Fare Register Co.
- **Fences, Woven Wire and Fence Posts**
  - American Steel & Wire Co.
- **Fenders and Wheel Guards**
  - Brill Co., The J. G.
  - Consolidated Car Fender Co.
  - Elec. Service Supplies Co.
- **Fibre and Fibre Tubing**
  - National Vulcanized Fibre Co.
  - Westinghouse E. & M. Co.
- **Field Coils (See Coils)**
- **Fire Extinguishers**
  - Foamite-Childs Corp.
- **Fire Fighting Devices**
  - Foamite-Childs Corp.
- **Flangeway Guards, Steel**
  - Godwin Co., Inc., W. S.
- **Floor Grating**
  - Irving Iron Works
- **Forgings**
  - Carnegie Steel Co.
  - Columbia M. W. & M. I. Co.
  - Duff Mfg. Co.
  - Standard Steel Works Co.
- **Frogs and Crossings, Tee Rail**
  - Bethlehem Steel Co.
  - Ramapo Ajax Corp.
- **Frogs, Track**
  - (See Trackwork)
- **Frogs, Trolley**
  - Ohio Brass Co.
- **Furnaces, Electric**
  - American Bridge Co.
  - Pittsburgh Elec. Furnace Corp.
- **Fuses and Fuse Boxes**
  - Columbia M. W. & M. I. Co.
  - Consolidated Car-Heating Co.
  - General Electric Co.
  - Western Elec Co.
  - Westinghouse E. & M. Co.
- **Fuses, Refillable**
  - Columbia M. W. & M. I. Co.
- **Gages, Oil and Water**
  - Ohio Brass Co.
- **Gaskets**
  - Power Specialty Co.
  - Westinghouse Tr. Br. Co.
- **Gas-Electric Cars**
  - General Electric Co.
- **Gas Producers**
  - Westinghouse E. & M. Co.
- **Gates, Car**
  - Brill Co., The J. G.
- **Gear Blanks**
  - Bethlehem Steel Co.
  - Carnegie Steel Co.
  - Standard Steel Works Co.
- **Gear Cases**
  - Chillingworth Mfg. Co.
  - Columbia M. W. & M. I. Co.
  - Elec. Service Supplies Co.
  - Westinghouse E. & M. Co
- **Gears and Pinions**
  - Ackley Brake & Supply Corp.
  - Bemis Car Truck Co.
  - Bethlehem Steel Co.
  - Columbia M. W. & M. I. Co.
  - Elec. Service Supplies Co.
  - General Electric Co.
  - National Railway Appliance Co.
  - Nuttall Co., R. D.
  - Tool Steel Gear & Pinion Co.
- **Generating Sets, Gas-Electric**
  - General Electric Co.
- **Generators**
  - Allis-Chalmers Mfg. Co.
  - Western Elec. Co.
  - Westinghouse E. & M. Co.
- **Girder Rails**
  - Bethlehem Steel Co.
  - Lorain Steel Co.
- **Goggles, Eye**
  - Ideal Face Shield Co.
  - Indianapolis Switch & Frog Co.
- **Gongs (See Bells and Gongs)**
- **Greases (See Lubricants)**
- **Grinders, Portable**
  - Buda Co.
  - Railway Track-Work Co.
- **Grinders, Portable Electric**
  - Railway Track-work Co.
- **Grinders and Grinding Supplies**
  - Indianapolis Switch & Frog Co.
  - Metal Thermit Corp.
  - Railway Track-work Co.
- **Grinding Bricks and Wheels**
  - Railway Track-work Co.
- **Guard Rail Clamps**
  - Ramapo Ajax Corp.
- **Guard Rails, Tee Rail and Manganese**
  - Ramapo Ajax Corp.
- **Guards, Trolley**
  - Elec. Service Supplies Co.
  - Ohio Brass Co
- **Hammers, Pneumatic**
  - Ingersoll-Rand Co.
- **Harps, Trolley**
  - Anderson Mfg. Co., A. & J. M.
  - Bayonet Trolley Harp Co.
  - Elec. Service Supplies Co.
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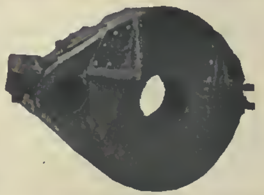

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Bayonet Trolley Harp. Co.
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International Creosoting and Construction Co.
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General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
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Ingersoll-Rand Co.
Pumps, Vacuum
Ingersoll-Rand Co.
Punches, Ticket
Bonney-Vehslage Tool Co.
International Reg. Co., The
Wood Co., Chas. N.
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Ramapo Ajax Corp.
Rail Grinders (See Grinders)
Rail Joints
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Rail Joint Co.
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Indianapolis Switch & Frog Co.
Metal & Thermit Corp.
Rails, Steel
Carnegie Steel Co.
Railway Paving Guards, Steel
Godwin Co., Inc., W. S.
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Consolidated Car-Heating Co.
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Rattan
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Seats, Car (See also Rattan)
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Consolidated Car-Heating Co.
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Signals, Indicating
Nichols-Lintern Co.
Oskel Equipment Co.
Signal Systems, Block
Elec. Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.
Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
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Slag
Carnegie Steel Co.
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Brill Co., The J. G.
St. Louis Car Co.
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Kress & Co.
Steps, Car
Morton Mfg. Co
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Irving Iron Works
Steps, Safety
Irving Iron Works
Stokers, Mechanical
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Westinghouse E. & M. Co.
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Irving Iron Works
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Nichols-Lintern Co.
Switches, Track (See Track, Special Work)
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Anderson Mfg. Co., A. & J. M.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
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Ramapo Ajax Corp.
Synchroscopes
Roller-Smith Co.
Tampers, Tie
Ingersoll-Rand Co.
Railway Track-Work Co.
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Tee Rail Special Track Work
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Ramapo Ajax Corp.
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Smith Heater Co., Peter
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Ticket Choppers and Destroyers
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Dayton Steel Co.
Ties, Metal Safety
Metal Safety Ry. Tie Co.
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Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.
Ties, Wood Cross (See Poles, Ties, etc.)
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Carnegie Steel Co.
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Metal & Thermit Corp.
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Combination Passenger, Smoking and Baggage Interurban Type Mounted on Brill 27-MCB-2X Trucks

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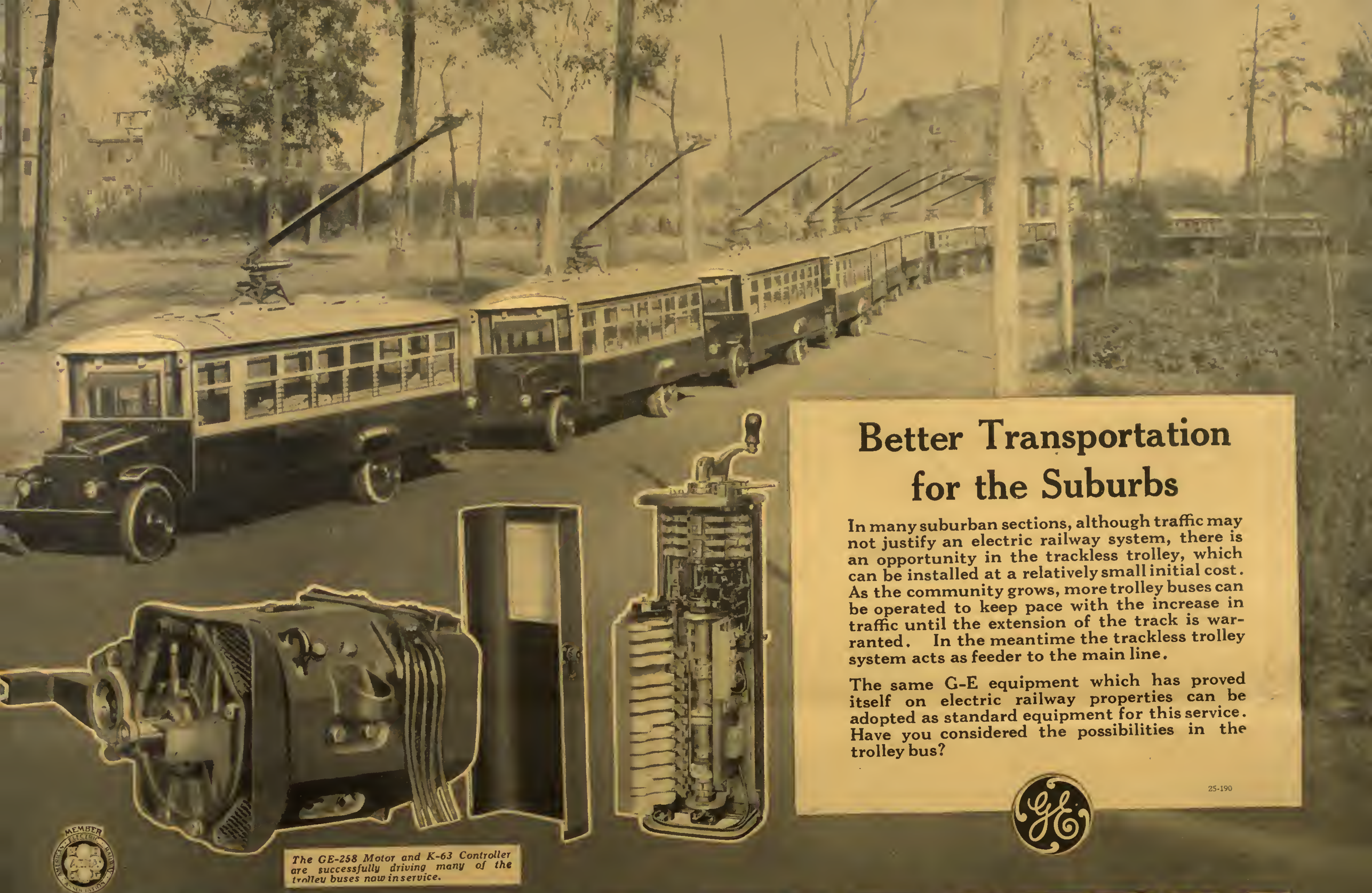

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25-190

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A Prompter Convention Service This Year

IN THE past ELECTRIC RAILWAY JOURNAL has reported the bulk of the Atlantic City convention of the American Electric Railway Association in the issue immediately following the convention, with the remainder, including the proceedings of the Accountants' and Claims Associations and miscellaneous sessions, following in the regular issues over a period of from two to four weeks. This year for the first time the complete program has been presented in the two issues immediately following the convention—the one of Oct. 13 covering the American, Engineering and T. & T. sessions, while the Claims, Accountants' and miscellaneous meetings are in this week's number. A great deal of effort and added expense have been incurred thus to present the material to our readers more promptly.

The value of this to our readers is hard to overestimate. The Claims and Accountants' Associations have held sessions that are just as important to those interested as are the sessions of the other associations. A large part of the value of the papers and discussions lies in having a chance to read and interpret them while the topics are live. This opportunity is afforded by the prompt reports published in the JOURNAL. They are available nowhere else for several weeks.

In order to include this great volume of material one important committee report, that on valuation, which was scheduled for this week's issue, has been crowded out. It will, however, be included in an early issue. Furthermore, the Monthly Maintenance Issue, which has 1,200 special subscribers, has been postponed from the third to the fourth issue this month to make this convention report service possible.

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Published weekly.
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
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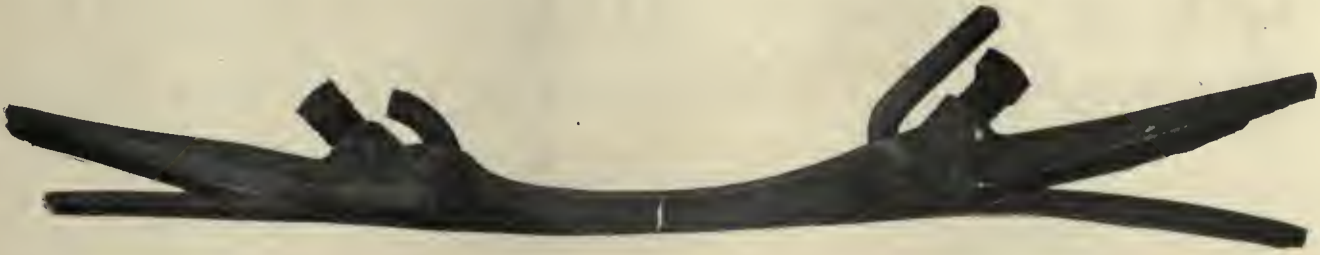

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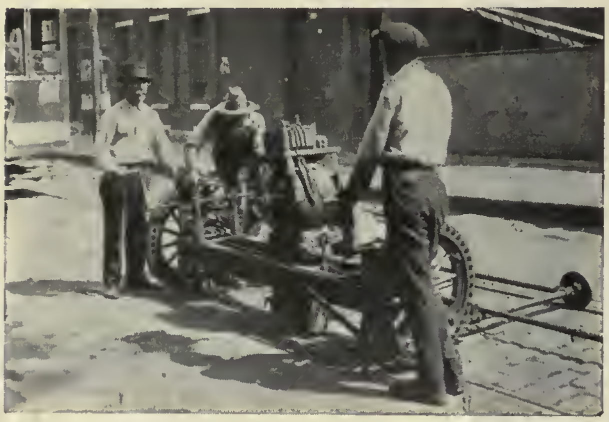

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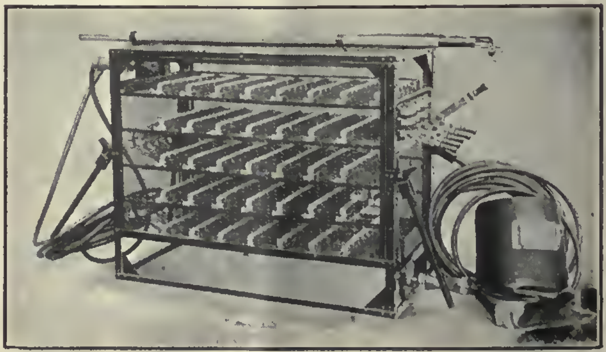

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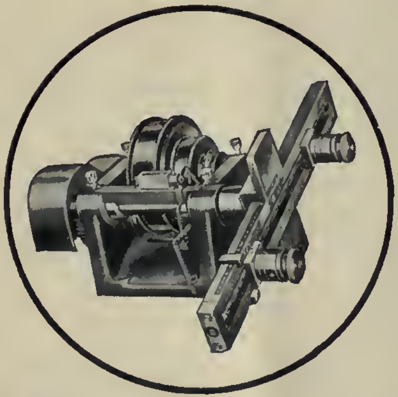

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Perhaps he was lured away by the prospect of a few more cents an hour. Maybe he quit in the heat of argument over some trivial affair. Ten chances to one, *some* removable misunderstanding is at the bottom of the matter. Whatever the reason, you lose—and scores, perhaps hundreds, of similar, preventable losses will be incurred within the year. Both employer and employee will suffer heavily.

We can engage both to lessen your labor turnover and to correct other faults that are making the payroll dollar worth but seventy-five cents in productive return to even well-managed businesses.

You will be interested in our booklet, "Stopping Payroll Losses," which is sent executives gratis, on request. Please address Dept. D-5.

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Largest organization of its kind in the world

Needless loss!

Fires of all kinds can be controlled at the start if fire protection is adequate and properly installed

Most plants that generate or use electric power have fire protection of one sort or another. Why, then, are bad fires so frequent?

Three things explain it: protection is inadequate for electrical risks, or it overlooks other (non-electrical) risks that should be covered, or it is not properly installed.

Incorrect methods not only fail to put out fire, but frequently make it *worse*. Burning oil—gasoline—paint—tar, will defy water or ordinary extinguishers. So will a blaze in live electrical equipment. And even correct methods may fall short if wrongly applied.

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Because Foamite-Childs fire protection engineers have studied fire in all its aspects, the men who represent this company can offer you concrete, scientific counsel on your particular fire problem. They can outline sure methods of thwarting fire no matter where or when it breaks out. Their suggestions lead to complete, reliable, constant security against *any kind* of fire.

Backed by a company that manufactures all types of chemical fire-extinguishing devices, these representatives are wholly unprejudiced. Not until they have found out what protection you need, do they recommend any specific installation. Once your needs are determined, they can offer the most modern, most dependable means of safeguarding every fire risk.

FOR ELECTRICAL FIRES, the *Fire-Gun* is always efficient. Its non-conducting stream stifles combustion in live electrical equipment. Adopted as standard equipment by many leading railroads and public utilities. Widely used for protecting automobiles and trucks.

Showing what may happen if a power house has inadequate fire protection

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A loss of $1,500,000 could have been prevented here if correct extinguishing methods had been applied when fire broke out

FOR BURNING OIL, PAINTS, CHEMICALS, and other "extra hazardous" risks, *Foamite* Protection is supremely effective. *Foamite* equipment throws over any burning surface a blanket of carbon dioxide gas bubbles (known as Firefoam) that smothers the fiercest fire. Available in portable hand extinguishers, portable engines, and large stationary systems.

WHILE FOR ORDINARY RISKS, *Foamite* equipment is the best protection. Where Soda-and-acid apparatus is selected, *Childs* extinguishers and engines have been standard for 27 years.

WHERE IT'S VERY COLD, the *Allweather* non-freezing extinguisher functions perfectly, down to 40° below zero, on ordinary fires.

In a word, Foamite-Childs Corporation offers complete protection against fire risks of every description. Through our many division offices located at convenient centers, we are equipped to design, install, and maintain the fire-protective system that each particular risk requires.

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WHETHER it's hand-painting, hand-carving or hand-labor of any kind, you know it takes longer and costs more than machine work. It's just as true of operating doors and steps on street cars as it is of stoking boilers.

NATIONAL PNEUMATIC EQUIPMENT
eliminates most of the hand-work on cars

And leaves the operator free to *get the fares*, to reduce delays, and to conserve his energy and attention for safer operation all the time. There is a suitable type of National Pneumatic equipment for every type of car and for every kind of operating condition.

Our representative will be sent to help you figure on your equipment. Ask for consultation.

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Galena lubrication on your cars or in your Power House means immunity from trouble—safe, reliable service 365 days in the year; greater mileage, lower upkeep and absolute protection to equipment.

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Lubricants that are demonstrating their matchless efficiency and economy on hundreds of Electric Railways.

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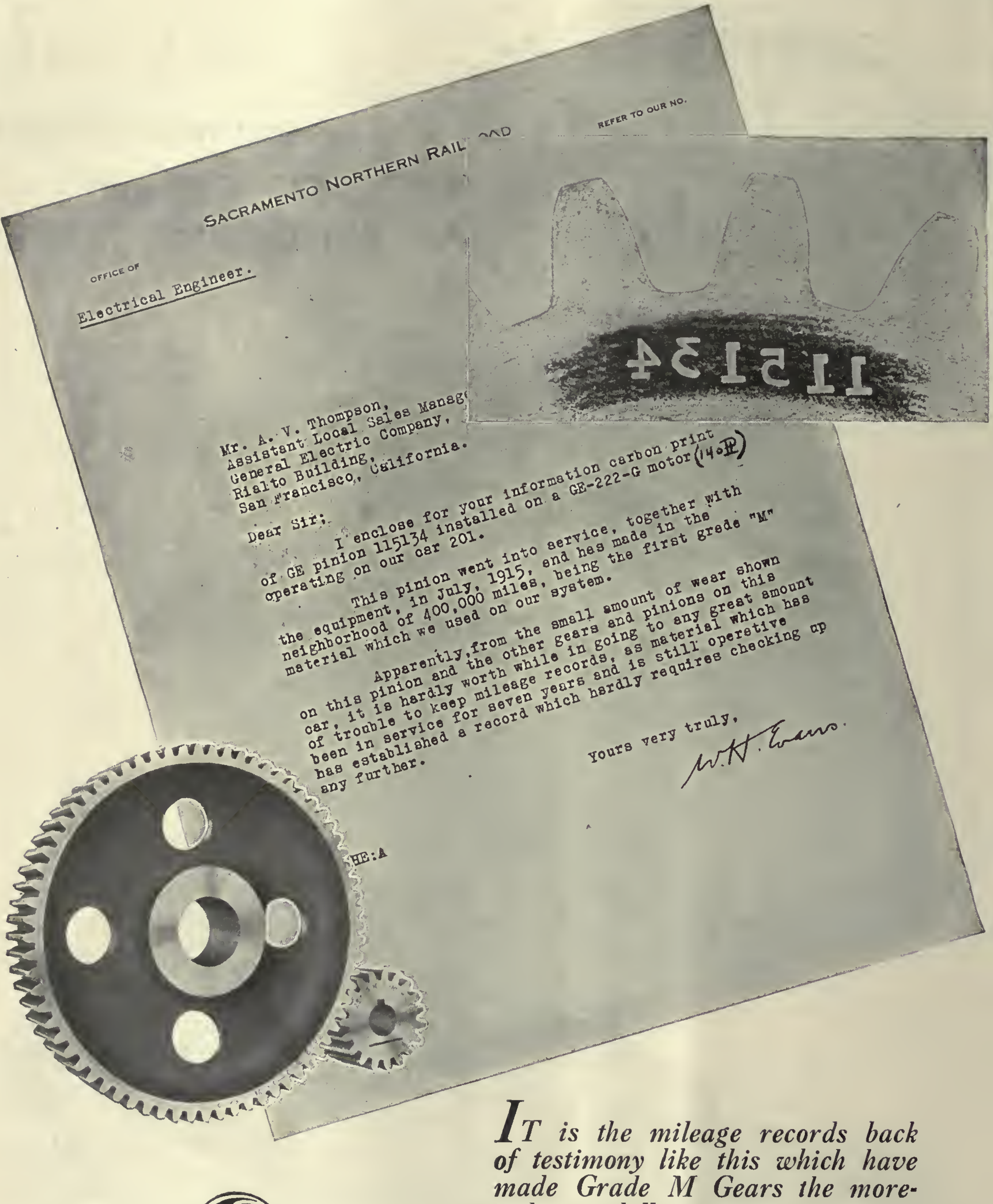

SACRAMENTO NORTHERN RAIL OAD

REFER TO OUR NO.

OFFICE OF
Electrical Engineer.

Mr. A. V. Thompson,
Assistant Local Sales Manag
General Electric Company,
Rialto Building,
San Francisco, California.

Dear Sir;

I enclose for your information carbon print of GE pinion 115134 installed on a GE-222-G motor (14-P) operating on our car 201.

This pinion went into service, together with the equipment, in July, 1915, and has made in the neighborhood of 400,000 miles, being the first grade "M" material which we used on our system.

Apparently, from the small amount of wear shown on this pinion and the other gears and pinions on this car, it is hardly worth while in going to any great amount of trouble to keep mileage records, as material which has been in service for seven years and is still operative has established a record which hardly requires checking up any further.

Yours very truly,

W. H. Evans.

HE:A

It is the mileage records back of testimony like this which have made Grade M Gears the more-miles-per-dollar gearing.

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GENERAL ELECTRIC

New York, Saturday, October 20, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 16

A Helpful Program of Activity for 1924

CONTINUED and intensified effort toward good public relations, study looking toward uniform regulatory laws and better franchises, modernizing plant and equipment and practices, study of how to secure relief from unjust tax burdens, further treatment of valuation matters, unification and co-ordination of all forms of transportation, rapid transit, and continuation of the educational work—these are the main topics to which the work of the American Electric Railway Association is to be devoted during the coming year. These are all matters in which the industry has a keen interest, hence the year's work should prove very helpful.

One particularly important assignment is that of modernization. In line with the recommendations of the subjects and meetings committee, this topic is to be handled by two committees, one on city operation and one on interurban operation. The object sought is to emphasize the need for modernization and to show what can be done in this direction. Much more has been done along this line by city properties than by interurban. Hence the work of the interurban committee will be particularly timely. The need here for improvement in nearly every way is so great that the opportunity of this committee to perform a real service to the interurban lines is exceptional. Its efforts will certainly be appreciated and welcomed by the interurban operators.

The study of the bus this year by the parent association will be devoted to the economics of the transportation needs of the community as a whole. The affiliated associations will consider operating details of the bus.

The Accountant Has a Real Opportunity

THE importance of the work of the accountant was well exemplified by the proceedings of the Accountants' Association published in the ELECTRIC RAILWAY JOURNAL this week. President W. G. Nicholson stated the matter concisely when he said in his address that the utility accountant of today is more than a bookkeeper, and that he must be well informed in all the various branches of the business.

Some of the topics discussed were co-operation with the national associations of other utilities and utility commissioners to standardize accounting methods, control of expenditures by the budget system, classification of accounts for subsidiary bus operations and stores accounting. This wide range of subjects gives an indication of the present-day problems with which the accountant is concerned.

The discussion on budgetary control was an indication of the opportunity before the accountant. In such studies the auditor can analyze the various sources of expenditure and point out where the executive should look to save unnecessary expenditures.

Perhaps more attention should be given to elimination of unnecessary or duplicate accounting work. In the study of some particular problem the executive may call for a certain analysis of accounts continued over a period of perhaps six months or a year. The solution may be obtained and the report forgotten by the general manager, but not by the accounting department. Following the established routine, the report may be prepared month by month, only to be filed away by some clerk without the knowledge of the executive. A close watch should be kept upon special or unusual reports to prevent such a waste of effort.

Altogether the auditor is one of the most useful aids to the management. The writer of this editorial has seen numerous instances where the management did not know the true financial condition of the road, largely because the auditor was unable to give the needed figures in such shape as to be useful. The first step toward making money is to know how to spend money wisely, and if the accounting department can do this a long step has been taken toward making a property successful.

Accountants' Association Should Have Support of More Companies

WHILE the present personnel of the Accountants' Association is quite active in following up the more important questions of the day, it goes without saying that a body of men numbering less than fifty at this time is working under a severe handicap. The membership in the association and the attendance at the conventions need to be increased materially before the industry can be expected to receive the full benefit therefrom. This is largely a matter for the accountants themselves to consider, but at the same time the executives of the various companies are in a position to encourage their accounting officers to enter into the work of the association and should do so whenever possible.

During the past few years the requirements of the electric railway accountant have been increasing steadily. He is continually being called upon to answer new questions and solve new problems concerning which he has no precedents. To a great extent he must work them out on his own responsibility, and in order to be of service to his company he must develop himself. Such self-development can of course come only through years of study and experience, but it can be materially facilitated through personal contact with other members of his profession and mutual discussion of the various problems. This is one of the most, if not the most, valuable features of the annual convention, and it seems unnecessary to say that it should be encouraged to the fullest extent.

One instance pointed out at one of the meetings of the association is worthy of particular comment, as it clearly shows the value of accurate figures furnished promptly to the management. By means of a detailed statement of maintenance costs on certain types and units of equipment it was possible for the general manager of a large company to keep in touch with conditions from day to day and thereby effect savings amounting to hundreds of thousands of dollars per year. This is an example of what the accounting department can do.

Leadership Needed in Traffic Problems

THE need for more comprehensive knowledge of street traffic and methods of regulating it was emphasized by the report of the committee on traffic regulations of the Transportation & Traffic Association and the ensuing discussion at the Atlantic City convention. The rapid increase of population of our urban centers and the even more rapid increase of the riding habit make the outlook for the future even more serious than the present situation, bad as it is.

Although the greater part of street congestion is due to the rapid increase in the use of motor vehicles, the various national automobile organizations are doing little if anything to reach a solution. The American Electric Railway Association and its affiliated associations have taken the lead and through several committees have made a start. It is little more than this, however, and most of the work lies ahead.

An interesting commentary on the causes of congestion was pointed out in the discussion. Removal of street car tracks is frequently advocated as the one cure for the transportation situation. The falsity of this position is seen from figures collected in Los Angeles and referred to in the discussion, which showed that the automobile traffic on streets without railway tracks was only about 40 per cent greater than that on streets where tracks existed.

When the relative carrying capacity of street cars and automobiles is considered the absurdity of the removal of car tracks to solve the traffic problem is apparent. Regardless of what is said by certain enthusiasts, the street cars carry the bulk of passenger traffic. The committee on traffic regulations pointed out that the average surface car system carries daily a number of passengers more than equal to the entire population of the city it serves. Even in New York City, with its extensive system of rapid transit lines covering four of its five boroughs, the surface cars carry some 40 per cent of the total riders.

The present haphazard methods of regulating traffic should somehow be made more effective from the standpoint of the greatest good for the greatest number. The many palliatives for congestion must be studied, standardized and applied where they can give relief. Municipal authorities must be brought to see that better traffic control is necessary for the continued growth and prosperity of their communities.

In view of the present and growing seriousness of the situation, and the need for immediate constructive work, the American Electric Railway Association can well undertake aggressively to secure the co-operation and support of all the interests affected. This is essential not only to safeguard the interests of the street railway industry but to render a still larger service to the communities all over the nation.

Definite Results Obtained at the Claims Convention

THE results accomplished at the 1923 convention of the Claims Association will be recorded with credit in the history of that organization. Two subjects which have taken considerable thought by committees as well as time of delegates at previous conventions were settled definitely at Atlantic City. The first of these was the acceptance of a code of ethics for railway claim agents. One of the encouraging signs of the times is the adoption of such codes by organizations representing professional men. It helps the insider to know what to do, and it helps the outsider to know what he may expect from men in that profession. The need of such a code for the railway claim agents has been felt for some time, and this need was well supplied by the code submitted by Mr. Sears of Boston. With one or two slight changes in wording which were suggested by the committee appointed to consider the code and were accepted by Mr. Sears, the code was promptly and unanimously adopted. This code should be of great benefit to the organization.

Extended discussion took place at the claims convention between those in favor of a large claims organization, prepared to look up and settle with prospective claimants, and the advocates of a small organization. The latter based their argument on the theory that if any one wants damages from a railway he should visit the office of the company and make his claim there. Here also a definite conclusion was reached by the delegates, i.e., that neither plan can be followed exclusively to advantage. In some cities, especially where there are large foreign populations apt to be misled by the wiles of the ambulance chaser, outside investigators seem necessary. Nevertheless, it is not too much to say that the evidence presented by Mr. Robinson of Cincinnati of what a very small force can do in favorable surroundings produced a great impression. In the future the burden of proof will rest on the manager of a large staff of claims investigators, adjusters and clerks that such a staff is necessary.

Outside of these two topics, the greatest interest at the Claims Association centered around the subject of automobile accidents. This also has been a perennial subject. The private automobile has done so much direct and indirect damage to the street railway—indirect in taking away its passengers and in blocking its right of way and direct in colliding with its cars—that the outlook seems about as dark as it could be. Nevertheless, here also progress was reported at the Claims convention. On this topic Cleveland seems to be the bright spot in the country, with its traffic courts, though the sun is shining through also at Rochester, Chicago and Detroit, which have courts of this kind, and seems about to break through the clouds in other cities. In fact, the history of the automobile menace promises to follow that of many other evils. When they get too bad, the people will rise up and suppress them. It is the hope of the claims agent that through some central point, perhaps a safety engineer at association headquarters, the coming of this relief may be hastened.

The Brief that Won the Charles A. Coffin Prize for 1923

The Intensely Interesting Story of the Chicago, North Shore & Milwaukee Railroad—a Story of Achievement—as Told in the Company's Brief Submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association Is Printed Here in Full, Together with a Few of the Illustrations

AS ANNOUNCED in last week's issue of ELECTRIC RAILWAY JOURNAL, page 591, in connection with the report of the Charles A. Coffin prize committee, the gold medal in the electric railway field was awarded this year to the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. The brief submitted by the company is a beautiful example of the printer's art. It is a printed book with a three-color and black process cover, which is reproduced herewith, though much of the effect is lost by the absence of the colors. Inside, the matter was printed on exceptionally fine deckle edge paper with illustrations printed in sepia, with hand-lettered headings for the main subdivisions of the report and with an insert reproduction of one of the company's three-color and black process posters reproduced in the original colors. The book was well illustrated with graphic charts showing the trend of the company's business, economies effected, etc., and with numerous pictures illustrating various types of equipment, including motor buses as well as cars, samples of posters used effectively, reproductions of billboard advertising, three pages of newspaper clipping reproductions, one of the company's fine new stations, pictures illustrating safety work and others showing the work the company is doing with its employees. Altogether the book comprises forty-seven pages and represents a considerable expenditure of effort.

Reproduction of the Cover on the North Shore Line Brief

The brief of the North Shore Line starts out with an introductory statement which sets forth the eight factors drawn up by the committee to indicate the matter which would be considered in making the award, and then explains the general manner in which these eight points were treated. These eight points were printed in connection with the committee report in last week's issue of the JOURNAL. The introductory statement also explains that clauses 3 and 4, which dealt respectively with the introduction of original ideas leading to economies, and the extent to which the company had taken advantage of economies originating with others, were treated jointly. The explanation given is that while many economies in operation on the North Shore Line have resulted from original ideas and experiments, the company has nevertheless not hesitated to apply practices developed on other properties if they seemed to be an improvement. But as it is difficult to substantiate a claim for originality in ideas, the North Shore Line was content to rest its claim for recognition, it said, on the manner in which it has taken advantage of every development in the industry and turned it into achievement. The full statement of the North Shore Line after the introductory chapter follows:

Popularizing Electric Railroad Service

THAT electric railroad service can be made popular; that a railroad can get more riders and more revenue in the face of the keenest competition; that it can get the communities it serves to work for it, instead of against it, is fully proved in the case of the North Shore Line.

It has been done.

Without increasing its trackage—except to the extent of gaining an entrance to the heart of Chicago over the elevated—the North Shore Line in the seven years of operation under the present management, has seen the number of its passengers double and its gross annual earnings multiply by five. It has seen the gross earnings from its freight traffic multiply by fifteen in five years; grow from an insignificant item to nearly a million dollars a year.

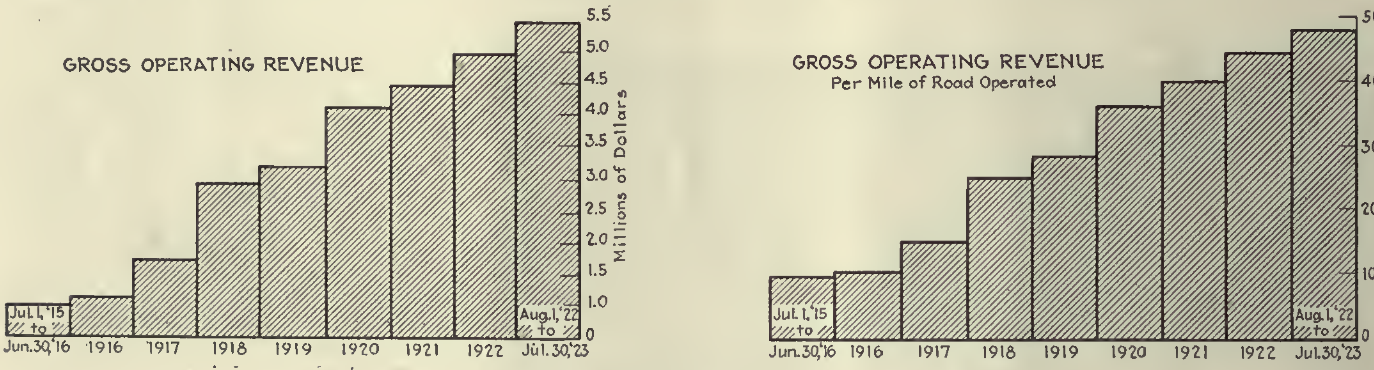
From a railroad patronized only as a necessity when other means of travel were not readily available, it has become "the most talked about electric railroad in the country," and is patronized by thousands of travelers in preference to any other means of transportation in the territory through which it runs.

How was this accomplished?

The answer may be epitomized in a single sentence: *By giving service and telling the public its story.*

SERVICE MUST BE CONVENIENT

An electric railroad to gain and hold the confidence and support of the public, must give a service that is convenient. The traveler going a considerable distance, thinks first of the time consumed on the way. To suit his requirements, trains must be operated at a high rate of speed with as few stops as possible.



Charts from the Brief Showing the Growing Popularity of the North Shore Line

For the traveler going a shorter distance, perhaps only a few miles to the next city on the line, speed is not as essential as frequency of service. He expects a train to be there to take him at almost any time he may wish to go. If it is there, he will patronize it and praise the service. If he has to wait for a train, he will try to get to his destination in some other way and complain about the character of the service given by the railroad.

Under the present management conditions on the North Shore Line are carefully considered from the standpoint of the needs of the public, and train schedules arranged accordingly. Service is classified under three heads —Limited, Express and Local. An hourly limited service is maintained between Chicago and Milwaukee, schedules being arranged so that trains leave both cities every hour, on the hour. Travelers do not have to refer to a timetable. The service is frequent and convenient and hence popular.

Between Chicago and Waukegan, a distance of about 35 miles, the territory is closely built up. Although there are a number of separate municipalities, for transportation purposes it is almost a continuous city, making more frequent service and more stops necessary. To meet this condition a half-hourly express service was put in effect. This is distinct from the limited service, although the latter is available also for travelers between Chicago and Waukegan, if they prefer it. This schedule provides a service of three trains an hour in each direction, besides a convenient local service.

Although this service was more than the traffic at first justified, it was maintained and soon the people began talking of the excellent service the road was giving. The sentiment gradually changed, and from hostile critics, the people along the line became enthusiastic boosters.

As through travel between Chicago and Milwaukee increased, the management decided that an even faster service should be given through travelers and three extra trains in both directions were recently put into service, making no stops between Evanston and Kenosha. These trains reduce the running time twenty minutes and proved popular from the first day they were put on. One of the trains is run to connect with the Twentieth Century and the Broadway Limited in Chicago, and is popular with business men in Milwaukee, Racine and Kenosha, desirous of making close connections with those trains without loss of time. Each of these trains was given a distinctive name, mainly for advertising purposes.

ANTICIPATING THE PUBLIC WANTS

It is the policy of the North Shore Line to anticipate the wants of the public and put on additional service without waiting to have requests made by its patrons. In line with this policy a half-hourly limited service was recently put on between Milwaukee and Kenosha, and although the traffic hardly warranted it, there has been a gradual and steady increase in business. The extra service is greatly appreciated by the people in the cities served, and it helps to strengthen the spirit of good will toward the company.

Although an average speed of almost a mile a minute is maintained on the northern division of the North Shore Line, it was found possible last September, when time schedules were being revised, to cut down the running time between Chicago and Milwaukee by five minutes. The fast time made by trains, combined with their frequency, is the biggest factor in the popularity of the company. With forty-six limited trains operating daily between Chicago and Milwaukee travelers do not have to seek other means of transportation because of inadequate service.

EQUIPMENT MUST BE MODERN

The foregoing brief sketch of the character of service given by the North Shore Line, is intended to show that adequate service is essential if popularity is to be achieved. But the mere running of trains does not mean service, as that term is understood by the traveling public of today. The term "service" embraces many things. No matter how frequently trains may be run, if they are made up of cars of obsolete type, unsightly in appearance and uncomfortable in riding qualities, they will not meet with popular favor. If the cars are good and the roadbed in bad condition, the service will not satisfy the public. If employees are untidy in appearance, careless in the manner in which they perform their work, if they do a small favor for a passenger grudgingly and only when asked, the service is not satisfactory. If ticket agents are not ready to answer correctly and promptly any and all questions asked by the public relative to service, prospective customers will turn away disappointed and form a poor opinion of the company. It is the policy of the management of the North Shore Line to see that no detail is overlooked to make riding pleasant and agreeable. Every item which enters into giving service, in the broadest sense of that term, is carefully checked and made as nearly perfect as it is humanly possible to make it.

IMPROVEMENTS IN TYPE OF CAR

Owing to the steady increase in business, it has been necessary for the North Shore Line constantly to keep adding to its equipment. Within the last year seventy-five new cars have been put in service, thirty-five of which were gondolas, fifteen merchandise despatch, twelve one-man safety cars, one line car, one dining car, two parlor-observation cars and nine steel coaches.

Marked improvements have been made in all the passenger cars over cars of similar type put in service as late as two years ago. The improvements are the result of careful study on the part of the company's engineers, based on experience, and conditions peculiar to the property. Passengers are quick to notice the improvements and remark that the company is always doing something to add to the comfort of its patrons. Good equipment is conducive to goodwill.

Heating and Ventilating

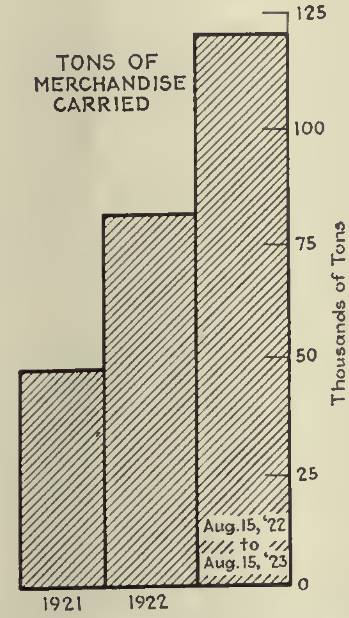
Proper heating and ventilating of cars are essential to the comfort of passengers. In those respects great improvements have been made in the latest type of coaches put in service by this company. Each car is equipped with a double system of heating, one consisting of a large water heater with circulating pipes, and the other of electric heaters of 630 watts capacity, each with thermostatic control. The electric heaters are used in the spring and fall, when weather conditions do not warrant the operation of the hot-water heaters. In extremely cold weather the electric heaters can be used in conjunction with the hot-water heater, if they are necessary to keep the cars comfortable.

For ventilation each car is equipped with one automatic intake and eleven automatic exhaust ventilators. The air from the intake ventilator is passed over the hot-water heater pipes before entering the car body. The electric lights are in the ceiling in large bowls giving a soft and well diffused illumination to the car. The dining cars are equipped with wall lighting fixtures, mounted on the panels between windows, in addition to the ceiling lights. Each car is provided with storm windows and with screens, and has three oscillating fans. Special attention was given the interior finish and fittings, so that the cars would be attractive as well as comfortable.

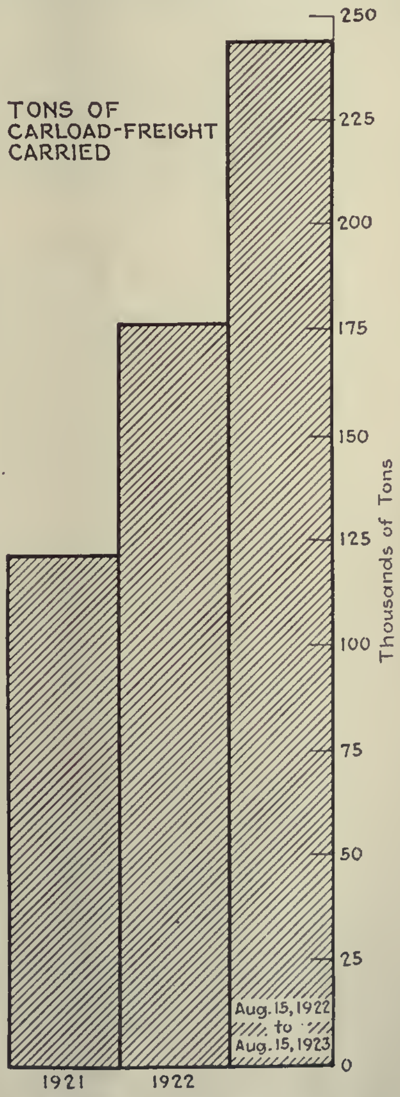
Parlor-Observation Cars

Two parlor-observation cars were placed in service in July, 1923, the first of the kind introduced on the North Shore Line. These cars have a seating capacity of 29 passengers, including the smoking compartment. They are equipped with the double system of heating used in the new type coaches, each car having twenty-five electric heaters of 500 watts capacity and a hot-water heater with circulating pipes. The ventilating system is the same as in the new coaches. The car interiors are finished in mahogany, rich and pleasing in appearance. The seats consist of large mahogany armchairs, upholstered in fine figured plush, the arms arranged to hold a small tray on which soft drinks and light lunches may be served.

That such comforts are appreciated by travelers was shown the first day the cars were put in service. Although an extra charge of 50 cents is made on these cars, they have been filled to capacity on every trip, indicating that the public will gladly pay for special service.



During the last year the management decided to extend the service by means of motor coach lines into territory without adequate transportation facilities, through tickets being issued good for both rail and bus lines. A fleet of twenty-seven company-owned motor coaches is now operating on four routes, additional ones being rented for special days when business is unusually heavy. In line with the established policy of having the most attractive equipment that can be obtained, four types of coaches are being used by the company, one being a parlor coach, which is reserved for special chartered car passengers. While the motor coach lines give a local service, they are intended principally as feeders for the electric railroad.



Charts Used to Show How Good Service Given Shippers Brings Increased Tonnage

Selling Transportation Service

Second in importance to giving good transportation service, is selling it to the public, and in that respect the North Shore Line has been unusually successful, as is proved by its rapidly growing business and the goodwill toward the company which exists in every community along the line. The selling of service is accomplished in a variety of ways, and no way is wittingly overlooked by this company. Giving the character of service outlined above, and providing the kind of equipment described, are in themselves strong selling factors, but they must be supplemented in other ways. The North Shore Line has a highly efficient traffic department, made up of experts trained in soliciting passenger and merchandise movements. These men make regular calls on the traffic departments of all manufacturers and business houses in Chicago, Milwaukee and intermediate cities. Even beyond the limits of those cities their efforts are extended into contiguous territory, and their personal solicitation is followed up by letters, rate cards and other literature.

Tracing of shipments is done, and advice on reconsigning or final delivery is given by long distance telephone, so the customer gets the information he seeks in a few minutes. Shippers appreciate that kind of service and feel disposed to favor a company which renders it.

Invitations are extended colleges and universities to have students in electrical engineering classes make inspection trips over the road.

Fraternal Organization Emblems

Fraternal organizations often charter special trains when making visits to sister lodges in the territory served by this company. To popularize the service with such organizations, signs bearing the emblems of the different societies are provided by the company. These signs are so constructed that they can be illuminated at night. When a chartered train pulls into a station where the members of a lodge are waiting, with the emblem of that organization looming up on the head end, it creates a favorable impression in the minds of the members. They are surprised and pleased and comment on the thoughtfulness of the company. Many letters have been received from members of lodges commending this feature of the service. It is just one of the small things that go to make a company popular with its customers.

In telling the public of its service, the North Shore Line advertises extensively in a variety of ways. Newspaper space is used regularly each week in all the daily and weekly newspapers in the smaller cities along the road. In Chicago and in Milwaukee, two newspapers are used each week, the schedule being arranged so that all the newspapers are given an equal number of lines. Space is taken in eighteen foreign-language newspapers in Chicago and Milwaukee alternate weeks. Car cards are placed in surface cars in Milwaukee and in surface and elevated cars in Chicago. Painted bulletin boards and posters are used, moving pictures, summer folders, and various kinds of literature.

ARTISTIC LITHOGRAPHED POSTERS

No form of advertising adopted by the North Shore Line has attracted as much attention, or caused as widespread favorable comment, as the lithographed posters used in the last year. These posters follow the idea of the London Underground System. They depict points of interest on the line and allow the picture to tell the story. Requests for copies of these artistic posters have come from universities and colleges all over the country, from public and private schools, church organizations and art schools. They have attracted the attention of magazines devoted to art, and the art departments of metropolitan daily newspapers. They are being used in the class rooms of high schools in Chicago and other cities and in a number of colleges. Art directors as far removed as the University of Washington in Seattle, read of these posters and wrote for copies to be used in class rooms. They are the work of well-known artists in Chicago, each one a specialist in a particular line.

PAINTED BULLETIN BOARDS

Another form of advertising which has attracted a great deal of attention and helped to popularize the North Shore Line, is the large painted bulletin boards, placed at carefully selected locations on automobile highways, junction points of railroads, and thickly settled sections of Chicago and Milwaukee. Like the posters, most of these bulletin boards let the picture do the talking. For example, one board placed on Chicago's principal boulevard, depicts an electric train racing with an aeroplane. It requires no words to convey the idea of speed. The name of the road is all that is necessary. The location of the board is such that it can hardly fail to catch the eye of everyone passing in an automobile, and thousands of cars pass the point daily. This form of advertising serves to keep the name of the company before the public.

Motion picture advertising and publicity is effective when done in a way that does not convey any suggestion of advertising to the audience. Owners of motion picture theaters know that an audience will not stand for any kind of advertising, and the better class houses will not display such pictures under any circumstances. The North Shore Line, however, has been able to get two reels, one showing its passenger service and one showing its Merchandise Despatch into the best houses in Chicago and Milwaukee. "The Green Bay Trail" contrasts transportation in the days of the Indians with modern transportation on an electric railroad and is readily accepted by theatre owners as an educational film. The only advertising is the name of the railroad shown on the cars, which was enough. "The Pace of Progress" depicts the advancement in methods of handling merchandise shipments since the days of the trapper, and follows the story up by showing an actual shipment from Chicago to Milwaukee in two hours and twenty minutes over the North Shore Line.

MINIATURE ELECTRIC RAILROAD

A miniature electric railroad with two four-car trains, one a passenger and the other a merchandise despatch, giving a panoramic view of the route of the North Shore Line from Chicago to Milwaukee has been used with good effect at several expositions held in the last year. The miniature cars are exact reproductions of the regular equipment and run electrically, causing a great deal of comment and helping to sell North Shore service.

COURTESY OF EMPLOYEES

Every employee of the North Shore Line who comes in contact with the public is a salesman of the service and helps to popularize the road. The employees take a personal pride in the railroad and are jealous to see that their work comes up to the high standard set by the management. This attitude of the employees is a subject of daily comment among passengers, many of whom write letters congratulating the management on the high caliber of its train crews. Attentions which may seem trifling frequently make lasting impressions, and the employees of this company are ever alert and watchful of every detail which may add to the comfort of their passengers.

SATISFIED PATRONS GOOD ADVERTISERS

Among the many factors which contribute toward the popularity of the North Shore Line, not the least important are its patrons. Many traveling salesmen are regular patrons of the road. They talk about it on their travels and induce fellow-travelers to give it a trial. Letters written to the editor of the *North Shore Bulletin*, show that the road has been the subject of discussion in hotel lobbies in Minneapolis, in Philadelphia, in Kansas City and even in Toronto and Montreal, Canada. It is the subject of many quips on the vaudeville stage from actors who have been shown some special act of courtesy when traveling between Chicago and Milwaukee. This is a valuable form of advertising, given the road gratuitously by satisfied customers and has added a great deal to its popularity.

Gaining Public Good Will

THE North Shore Line enjoys in a remarkable degree the good will of the public in the communities which it serves. This pleasing result has been brought about by careful cultivation of good will in a great variety of ways.

When the present management took charge of the property, following the reorganization in 1916, the road was in a badly run down condition. It had been operated under a receivership for nearly ten years, during which time no improvements were made and only such maintenance as was absolutely necessary to keep the line in operation. Under such conditions it was natural that prejudice against the road should exist, and the new management had to meet and overcome that handicap. It made the building up of the property and the gaining of public good will more difficult than would be the case where no prejudice existed.

FIRST GIVE SERVICE, THEN SELL IT

There are many ways in which a public service company may break down existing prejudice against it and gradually build up co-operation and good will. Minor details, which taken by themselves, seem insignficant, all contribute toward the general result, but there are two things which are fundamental, without which success cannot be achieved. A company in the first place must *give* the public service, and in the second place it must *sell* that service. In both these fundamental respects, the North Shore Line has been successful.

Immediate improvement of the service was the first step undertaken by the new management. New equipment of improved type was purchased, old equipment was remodeled, roadbed improved, schedules rearranged and the service classified to suit the convenience of the travelers. This rebuilding of the property was a gradual process. It has been going on since the first day the road came under the present management and will continue to go on indefinitely, for a public service company cannot stand still and hope to be successful.

"DOING THINGS" BRINGS GOOD WILL

Public sentiment toward the North Shore Line has undergone a complete change under the present management. A new spirit has been injected into the property and the public has been quick to note the change and react to it favorably. The road is "doing something" all the time. There is nothing which arouses public interest in a company so much as to have it constantly doing something new, making some improvements here or there, showing that it is alive, and trying its best to please its patrons. That feeling once created in the public mind, good will must inevitably follow. Even shortcomings in service will be overlooked. The public will say: "Give it a little time. It cannot do everything at once, but it is doing something all the time." The North Shore Line has convinced its patrons that its creed is service, and that accomplished, the gaining of good will is easy.

GETTING FAVORABLE PUBLICITY

Next in importance to "doing things," is telling the public what a company is doing. True, an improvement in service will soon be noticed by those who use it, but it is a good thing to call their attention to it. In this respect the North Shore Line is singularly fortunate. Few railroads get as much free publicity. Hardly a day passes that some newspaper published along the line does not carry a news story about the company. The accompanying reproductions of newspaper clippings are submitted, not for the purpose of showing how much publicity the company gets, but rather to show the variety of ways in which a company can get into public print in a favorable way. As a matter of fact the clippings represent a small fraction of the total number of stories printed in the last year, but are selected because of their variety. They show the various activities in which the company, or its employees, are engaged, and in no sense are they "press agent" stories, as that term is commonly understood.

The reason why the North Shore Line gets so much favorable publicity, is that it is constantly making "news." A glance at the clippings reproduced will show that they are not items prepared by a "press agent." That method of obtaining publicity, happily is disappearing. It is never even attempted on the North Shore Line. The policy of the North Shore Line is to make "news" and publicity will take care of itself. Newspapers, especially in small cities, such as those served by this company, are anxious to get legitimate news stories of new activities. The North Shore Line is a part of the communities it serves. Anything that it is doing in the way of improvements, anything that its employees may do in the communities in which they live, is of general interest and as such is worthy of space in the newspaper columns.

THE "NORTH SHORE BULLETIN"

As an aid in publicity work and as a medium through which to cultivate good will between the public, the employees and the company, the *North Shore Bulletin* is published monthly. This little publication has attracted a great deal of attention and has built up quite an extensive following. It has readers scattered all over the country, men and women, who have accidentally run across a copy, read something that interested them, and written to the editor to have their names placed on the mailing list. The mailing list numbers about two thousand, a majority of whom have requested to have the publication sent them, many offering to pay for it. The issue is 15,000 monthly, distributed through boxes placed in the cars and at the various stations along the line. Every copy is carried away within a few days of the time they are placed in the cars and stations.

The *Bulletin* has proved a factor in building up good will. It serves as a link between the public, the employees and the company. A passenger who has been shown some exceptional courtesy, or received a favor from a trainman, writes a letter about it to the *Bulletin*. The letter is published in the next issue. It pleases the particular employee commended and it pleases the passenger. Another passenger will read it and it suggests the idea to him of commending some employee, or some feature of the service. Many of the letters comment on the *Bulletin* itself, but whatever the nature of the letters, the important thing is that they are written and that they serve to keep the road in the minds of its patrons.

BAGGAGE SERVICE
ON NORTH SHORE TRAINS
is frequent and highly efficient
Baggage checked from home to destination without re-checking
EASTERN LIMITED
CHICAGO NORTH SHORE & MILWAUKEE R.R.

One of Several Posters Reproduced in the Brief

Occasionally a letter is written the *Bulletin* criticising some operating practice which may cause inconvenience. Complaints of that character are taken up at once, the condition is remedied and a courteous reply sent to the person making complaint, thanking him for calling attention to it. No criticism or suggestion is ever overlooked. If it is not practicable to carry out a suggestion, the reasons are fully explained, usually to the complete satisfaction of the person offering the suggestion. Letters in the nature of complaint or criticism are exceedingly rare, but the management welcomes them and gives them prompt attention. An average of thirty letters a month are written to the *Bulletin*.

Another way in which the *Bulletin* is useful, is as an indirect publicity medium. Every activity of the company is exploited in it. Each month some of the newspapers along the line find something in the *Bulletin* that they consider worthy of space in their columns. Sometimes items of news are rewritten as news stories, other times they are printed verbatim and credited to the *Bulletin*. Either way they make good publicity for the company.

The *Bulletin* serves as an aid to the traffic department in obtaining business. It is the practice each month to write a descriptive story of some manufacturing plant or business establishment on the line. These writeups are illustrated and are of some advertising value to the particular concern written up. They are entirely gratuitous, and tend to create a friendly feeling on the part of the concern toward the company. Requests and invitations to write up plants are sent the *Bulletin* faster than they can be complied with. Many times a firm receiving such a writeup requests a supply of copies, to mail, so in that way the *Bulletin* gets into hands it would not otherwise reach. Recently one institution requested 2,000 copies to mail, offering to pay the cost of printing.

PUBLIC FUNCTIONS INCREASE GOOD WILL

When the North Shore Line opens a new station of importance, installs a bus line, puts into service some new equipment like observation cars, it is the custom to celebrate the event with a dinner, to which public officials, representatives of business men's associations, and newspaper publishers are invited. Several such occasions have been celebrated in the last year with gratifying results in the way of obtaining favorable publicity and strengthening the spirit of co-operation and good will. On the eve of the opening of the bus line connecting Kenosha and Lake Geneva, a dinner was given in the latter city. The mayor and aldermen from Kenosha, together with representatives of the manufacturers' and retailers' associations, met with like officials and representative business men in Lake Geneva. At the close of an enjoyable evening all pledged the new line their hearty support. The same course was followed on the opening of a bus line connecting Waukegan and Kenosha, and on the opening of the latest line between Wilmette, Highland Park and Waukegan.

These public dinners serve a two-fold purpose. They bring together the public officials of different cities with officials of the company and they make good publicity for the newspapers. The new bus line, or whatever the particular service may be, starts out with the support of public officials and newspapers. It is an effective way of creating good will.

An improved system of ticket auditing, through which the prompt refunding of unearned revenue is accomplished, recently was perfected on the North Shore Line, and has proved an important factor in creating public good will.

When a passenger claims a refund on an unused ticket, under the new system five days is the maximum time which elapses until a check for the amount is in his hands. Usually the time does not exceed two or three days.

While this is seemingly an unimportant detail, the hundreds of letters received from pleased patrons indicate that they appreciate it. In the merchandise despatch service, refunds are made with equal promptness, many times without the shipper making any claim. When waybills are checked and an overcharge discovered, a check for the amount of overcharge is immediately sent the shipper. This promotes confidence in the company and expedites adjustments in cases where customers have been charged too little.

Economies in Operation

IN seeking to effect economies in operation, an electric railroad situated like the North Shore Line, subject to the keenest kind of competition, must consider the subject from many points of view. What may seem an economy today, may within a year prove a grave error in business judgment and bring results directly opposite to what was intended.

While the North Shore Line is steadily effecting economies in many directions, they do not necessarily loom up large on its balance sheet. They are not effected by a curtailment of the service given the public. The company operates through a rapidly developing territory. It is building up its business, and steadily creating new business.

A railroad differently situated might be able to show economy by curtailing its service. In a fully developed territory, a curtailment of service during a business slump, might prove a real economy. In a growing territory it might easily be the reverse.

Were the chief purpose of the North Shore Line to reduce its car mileage to the lowest possible point at which it might operate a service that would escape the criticism of regulatory authorities or of its patrons, it might be possible to effect an economy. But would it be a real economy? Could the company hold its patronage and increase it, if it allowed its trains to be overcrowded through insufficient service? If part of its patronage left it for other competing means of transportation, would a restoration of service bring back that patronage? Would its patrons continue to praise the service and recommend it to others?

The policy of the North Shore Line is one of strict economy, but not at the expense of the public. The management feels that the good will of the public is the road's greatest asset and it fosters and guards that good will jealously. If the gross earnings justify a measure of service better than sufficient to escape criticism, the management believes the public should have that service, even if it means somewhat less net revenue to the company. For the North Shore Line that policy appears to be real economy.

AUTOMATIC SUBSTATIONS

Extensive use has been made of automatic substations in expanding and raising the efficiency of the power distribution system and reducing operating expenses. The first installations were made at the time when this type of station was in its early development stages, and these installations were of material help in the development of apparatus, and demonstrating its applicability to heavy traction work, thus benefiting the industry as a whole in paving the way for greater efficiency in power distribution.

Since the first installations were made stations have been added from time to time until we now have seven in service. Six of them are new stations added to the system; one was a manually operated station to which automatic control equipment has been added, and we are now completing the changeover of a second manually operated station to automatic which will bring the total up to eight.

Considerable progress has been made in developing outdoor type power transmission apparatus which has aided in reducing cost of substation installation, due to reducing size of buildings. We have taken advantage of this development and in our latest substation have placed all high tension apparatus outside the building with a resultant reduction in first cost and fire hazard.

Extensive application of automatic substations has made it desirable to develop some means of supervisory control so that a dispatcher at a central point would know whether or not stations were operating and also make it possible for him to control these stations. This problem differs on an interurban property from an urban property and requires a different solution. We have done a great deal of experimental work with such a system and through the co-operation of the manufacturers we have developed one which gives good results with a minimum of equipment and expense.

As better and more efficient protective apparatus has been put on the market for power systems we have applied them where economy and elimination of service interruptions would result, thus keeping our system up to the highest possible state of efficiency and reliability.

The tendency of the times in power generation work is to standardize on a frequency of 60 cycle for all kinds of power work, eliminating all other frequencies as they tend to duplicate investment in station and line equipment. This changeover is being actively followed by the power companies from whom we purchase power, and in spite of the fact that our long term power contracts call for furnishing 25-cycle energy we are co-operating in the movement by installing all new apparatus with 60-cycle equipment even though it entails considerable inconvenience, additional expense and temporarily some duplication of transmission lines. The results to be obtained from this progressive policy can not help but be of benefit to the industry and the public at large in reducing the cost of service.

REDUCTION IN POWER CONSUMPTION

Believing that the greatest economy can be had only by careful analysis of all items which enter into cost of rendering service, power recording meters were installed on all passenger equipment and accurate records kept of power required per car mile in all classes of service. The reduction in energy consumption which followed the installation of this metering equipment was due to several causes, but each of the steps taken to accomplish results were studied with the aid of these meters.

Some of the factors entering into a reduction in power consumption are:

1. Careful coaching of motormen in proper operation of trains.
2. Substitution of new, lighter and more efficient car equipment.
3. Study of effect of using proper type of equipment in various classes of service.
4. Study of effect of properly balancing up motor and trailer cars in various classes of service.
5. Establishment of a number of non-stop limited trains.
6. More scientific basis of making up schedules and elimination of stops wherever possible, especially at times of peak load extra service on heavy days.
7. Enlarged terminal track facilities in Chicago which made it possible to avoid interference from local transportation system, thus eliminating unnecessary stops and slow downs.
8. Substitution of one-man cars for heavy two-man cars in Waukegan and Milwaukee.
9. Improvement in average line voltage making it possible to do more coasting.

ECONOMIES OF ONE-MAN CARS

Installation of one-man safety cars in the city of Waukegan, where the North Shore Line supplies all the local transportation service, and later in Milwaukee, where this company furnishes a portion of the local service, has resulted in greatly improving the service, increasing the number of passengers carried and reducing the cost of operation.

At the time the one-man cars were introduced in the local service in Milwaukee, February, 1923, a ten-minute service was being maintained and the fare charged was 6 cents. With the installation of the safety cars a six-minute service was given and the fare was reduced to 5 cents. At the same time the wages of the employees were increased 4 cents an hour.

In spite of the reduced fares and increased wages the first three months of operation showed an average increase in revenue over the corresponding months of the previous year of 34 per cent, while the increase in operating expense was 11 per cent. The increase in passengers carried was 58.5 per cent and there was a decrease of 21 per cent in power consumption.

ECONOMIES OF VARIOUS LABOR-SAVING MACHINES

Previous to the installation of National Cash Register ticket machines, one-way passenger tickets were printed at a cost of about 83 cents a thousand. Records had to be kept of about 4,100,000 one-way tickets. It required the time of two traveling auditors to audit the ticket accounts. Ticket agents spent from one to two hours daily making out their reports. Passengers had no receipts for the amount of money paid for tickets. Identification hat slips had to be purchased by the company and made out by conductors on trains.

With the installation of the ticket machines the advantages and economies obtained may be summarized as follows:

1. A saving of approximately forty cents a thousand in the cost of printing one-way tickets, due to the fact that these machines print the tickets.
2. A saving of about 50 per cent of time spent in keeping stock records of one-way tickets.
3. The time of one traveling auditor eliminated.
4. About 75 per cent of time spent in making out reports by ticket agents is eliminated.
5. The traveler has check for actual amount of money paid for ticket, which amount is printed on each ticket. This, in case of any claim, provides for prompt adjustment.
6. Printed identification hat checks form a part of the ticket and are easily detachable from it. These checks expedite the work of the conductor, and when detached, automatically cancel the tickets.
7. The tickets provide a positive check against the agent as each ticket has a serial number which cannot be changed.

It is the policy of this company to substitute machine for hand labor wherever possible, and a number of important improvements have been made in that direction during the last year. Among them may be noted:

Substitution of a Rand visible file for the bulky ledger formerly used for keeping ticket records. This has effected an economy of about 10 per cent in the cost of keeping records, besides being more accurate.

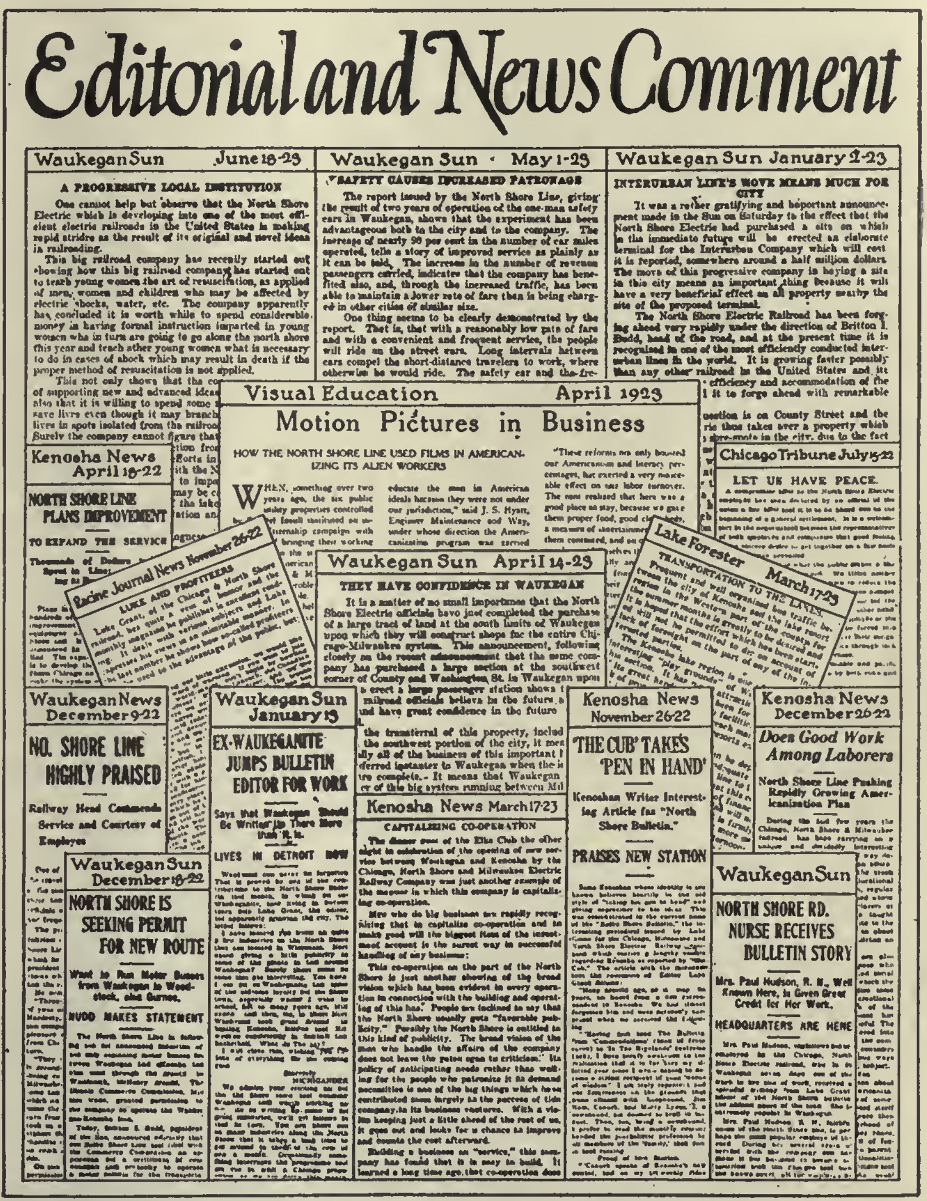
Analyzation machine for analyzing daily ticket sales. This machine, with one clerk working two-thirds time, does the work which formerly required the full time of two clerks.

Underwood Fanfold billing machines, installed in the two heavy merchandise despatch stations, do the work formerly done by four clerks, and the work is much neater because the bills are typed instead of being written by hand. As a result of this experience, these machines are being installed in all merchandise despatch stations.

Expressions of surprise at the smooth working of the merchandise despatch filing system, come frequently from shippers with claims to prove and others who understand shipping problems. Two recent examples may be cited:

A large shipper called at the Milwaukee office to obtain information relative to the shipments of goods which had been returned to a concern which refused credit for them on the ground they had not been received. Although the shipments were numerous and covered a period of two years the complete records were ready for him in a few minutes. He expressed a wish to know more about our system, as he said no other transportation company had ever been able to give him similar service.

An agent of another railroad called for information about a shipment which had been transferred from his road to the North Shore Line. In a few minutes he had the necessary data. He was greatly impressed and returned later with others from his company. The result was that his road installed the system.



Editorial and News Comment

Waukegan Sun June 18-23

A PROGRESSIVE LOCAL INSTITUTION

One cannot help but observe that the North Shore Electric which is developing into one of the most efficient electric railroads in the United States is making rapid stridre as the result of its original and novel ideas in railroading.

This big railroad company has recently started out showing how this big railroad company has started out to teach young women the art of resuscitation, as applied of men, women and children who may be affected by electric shocks, water, etc. The company apparently has concluded it is worth while to spend considerable money in having formal instruction imparted in young women who in turn are going to go along the north shore this year and teach other young women what is necessary to do in cases of shock which may result in death if the proper method of resuscitation is not applied.

Waukegan Sun May 1-23

SAFETY CAUSES INCREASED PATRONAGE

Waukegan Sun January 2-23

INTERURBAN LINE'S MOVE MEANS MUCH FOR CITY

It was a rather gratifying and important announcement made in the Sun on Saturday to the effect that the North Shore Electric had purchased a site on which in the immediate future will be erected an elaborate terminal for the Interurban Company which will cost it is reported, somewhere around a half million dollars. The move of this progressive company in buying a site in this city means an important thing because it will have a very beneficial effect on all property nearby the site of the proposed terminal.

Visual Education April 1923

Motion Pictures in Business

HOW THE NORTH SHORE LINE USED FILMS IN AMERICANIZING ITS ALIEN WORKERS

Kenosha News April 18-22

NORTH SHORE LINE PLANS IMPROVEMENT

TO EXPAND THE SERVICE

Chicago Tribune July 15-22

LET US HAVE PEACE.

Racine Journal News November 26-22

LUKE AND PROFITEERS

Lake Forester March 17-23

TRANSPORTATION TO THE LAKES.

Waukegan Sun April 14-23

THEY HAVE CONFIDENCE IN WAUKEGAN

It is a matter of no small importance that the North Shore Electric officials have just completed the purchase of a large tract of land at the south limits of Waukegan upon which they will construct shops for the entire Chicago-Milwaukee system.

Waukegan News December 9-22

NO. SHORE LINE HIGHLY PRAISED

Railway Head Commends Service and Courtesy of Employes

Waukegan Sun January 13

EX-WAUKEGANITE JUMPS BULLETIN EDITOR FOR WORK

Says that Waukegan Should Be Written Up There More than It Is

LIVES IN DETROIT NOW

Waukegan Sun December 18-22

NORTH SHORE IS SEEKING PERMIT FOR NEW ROUTE

Want to Run Motor Busses from Waukegan to Woodstock, and Gurnee.

BUDD MAKES STATEMENT

Kenosha News March 17-23

CAPITALIZING CO-OPERATION

The dinner given at the Elks Club the other night in celebration of the opening of new service between Waukegan and Kenosha by the Chicago, North Shore and Milwaukee Electric Railway Company was just another example of the manner in which this company is capitalizing co-operation.

Kenosha News November 26-22

'THE CUB' TAKES 'PEN IN HAND'

Kenoshan Writer Interesting Article for "North Shore Bulletin."

PRAISES NEW STATION

Kenosha News December 26-22

Does Good Work Among Laborers

North Shore Line Pushing Rapidly Growing Americanization Plan

Waukegan Sun

NORTH SHORE RD. NURSE RECEIVES BULLETIN STORY

Mrs. Paul Hudson, R. N., Well Known Here, Is Given Great Credit for Her Work.

HEADQUARTERS ARE HERE

One of the Three Pages of Newspaper Clippings Reproduced to Show How Favorable Comment Has Been Gained. The Hand-Lettering at the Top of This Cut Is a Sample of the Headings Used for the Main Divisions of the Brief

Improvements in Construction

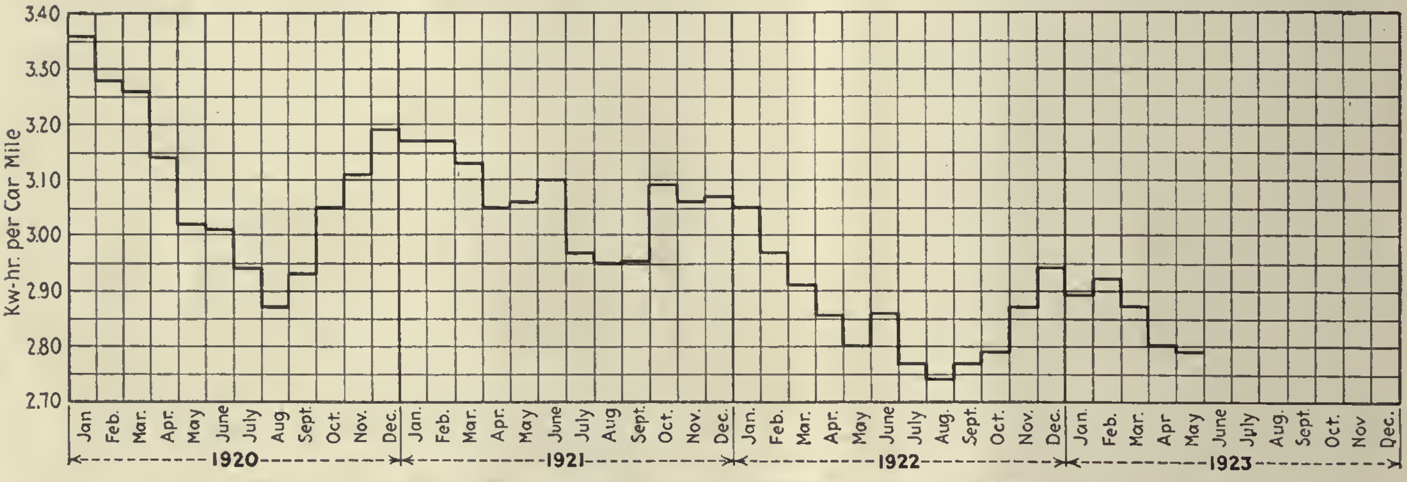
IN seeking ways to popularize travel by an electric railroad, to create good will in the communities served by it and increase its revenue, there is nothing more important than the character of construction it adopts. This has been fully demonstrated on the North Shore Line in the case of its new passenger stations in Milwaukee and Kenosha.

The Kenosha passenger station was opened to the public less than a year ago. An increase in business at that point was noticeable immediately after, and it is steadily growing. The station is a standing advertisement for the company.

Business conditions at Kenosha made a new station imperative. Traffic had outgrown the former station. A less pretentious station, however, might have met the requirements for several years. But the management decided that capital invested in a station that would stand out as a distinctive landmark and be looked upon with pride by the local community, would pay returns. The results have fully justified that decision.

The building is a handsome structure, the walls being pressed brick, with three-quarter inch raked joints, cast concrete trim, massive concrete pillars and a glazed tile roof. The station is equipped with all the conveniences of a modern railroad station, lunch counter, women's rest room, newspaper and magazine stands, shoe-shining parlors, etc.

The grounds surrounding the building are spacious, and here artistic flower beds have been laid out, winding footpaths, ample parking space for automobiles and for company buses, which connect with the main line at this point. It is looked upon by the citizens of Kenosha with pride and is pointed to as one of the show places in the city. The importance of that in the way of creating good will cannot be overestimated.



Curve Showing Reduction in Energy Consumption Accomplished by Various Means Noted in the Brief

Making Smooth Riding

In these days when travel on rubber tires is the popular fad, when luxurious motor coaches and automobiles are competing with railroads for public patronage, the electric railroads must exert all their energies toward making travel fast, safe, smooth and comfortable. They cannot afford to overlook a single detail in the matter of equipment, roadbed, or, in fact, anything which enters into the operation of a railroad.

With this thought in mind, the North Shore Line is constantly striving to make improvements. It is now rock-ballasting its roadbed over the entire system, more than 60 per cent of this work being completed. The best equipment will not ride smoothly over a poor roadbed.

Heavy rails add to the smooth riding qualities of a train and the North Shore Line is replacing all light rail with 100-lb. rail on the main line and on some of the city streets with 116-lb. rail.

In the city of Milwaukee a new type of chrome nickel crossing has been installed at a number of locations. These crossings are made of much harder material than the ones they replaced, and being cast in one piece, the shifting or loosening of sections is eliminated.

Making It Easy for Autoists

Hundreds of automobiles daily cross the tracks of the North Shore Line. In the belief that smooth crossings create a friendly feeling toward the company on the part of the public, a new type of crossing has been placed in use that has been the cause of many favorable comments. It consists of a composition made of graded sizes of limestone with screenings and Headley road oil. Long rails were laid at crossings so as to eliminate joints. The result is that these improved crossings make as smooth riding as cement roads.

Wood platforms are being replaced all over the system. At the more important stations concrete and brick platforms are being substituted, but at the smaller stations a new type has been developed and made standard. It consists of a fill with cinder base and a top dressing of fine limestone screenings, bound by a curbing of 4x12 creosoted timber. The hazards caused by loose boards and nails are removed and there is less danger of ice forming on this type of platform.

Accident Prevention

The Chicago, North Shore & Milwaukee Railroad is frequently referred to by its friends the "the safest high-speed electric railroad in the country." Whether or not this claim can be substantiated, it cannot be disputed that the North Shore Line has done, and is doing, excellent work in the way of accident prevention.

Records show that the settlement of personal injury and property damage claims amounts to 1.82 per cent of gross earnings. In the year 1922 the company had one accident for every 16,081 car-miles operated. When it is considered that record is made of every accident, no matter how trivial; that the road operates through a territory in which automobile travel is heavy, with many grade crossings; that trains constantly are run at a speed of 60 miles an hour and upward, the record speaks for itself.

Safety work on the North Shore Line is not occasional and spasmodic. The safety department of the road is thoroughly but simply organized, under systematic plans which assure continuity of effort. It is required to operate with the same exactness as other departments. The management, supervisory forces, and in fact the entire organization of the company, recognize the safety department as having the same status in operation as other operating departments.

Since the North Shore Line was brought under the present management in 1916, it has constantly engaged the services of the Bureau of Safety, a well known organization specializing in the safety of public utility operation. In the last year, however, it has supplemented this service by the employment of a trained director of safety, who devotes all his time to accident prevention. The Bureau of Safety continues to give consulting service and constantly keeps some member of its staff working in co-operation with the safety director.

Community Safety Work

The work of accident prevention on the North Shore Line is not confined to employees. The company is active in community safety work in the territory which it serves. Several active community safety organizations have been formed in the last year as a result of the influence and assistance of the company's safety department. Each year the company provides the public and parochial schools within the territory with lectures on safety, paying the expenses. Illustrative of the scope of this work the records show that between March 1 and July 15, 1923, 570 such lectures were given before 22,548 pupils. It is difficult to distinguish between the value of the safety work within the organization of the road and that to the public, but on a property like the North Shore Line, it is essential that the public as well as the employees, should be educated.

EDUCATING THE PUBLIC

In addition to conducting lectures in the public schools the North Shore Line prints many safety posters and cards which are displayed in class rooms, libraries and other public gathering places. This summer the company had a number of decalcomania labels printed which are used on the windshields of all automobiles driven by officers or employees of the company reading: "This car stops at all railroad crossings." These labels attract a good deal of attention and suggest the thought to other drivers to do likewise.

During the year 1922, 152 safety meetings of employees' groups and committees were held. At these meetings 884 safety recommendations were submitted, 707 of which were approved and carried out. Inviting suggestions from the employees themselves and acting upon them promptly stimulates their interest in the work, and assures their co-operation.

SAFETY EDUCATION OF TRACKMEN

Most of the meetings of employee groups are held after their day's work, the meeting places being arranged to best suit the convenience of the men, but in the case of track laborers, who are scattered along the entire road, this method was found to be inconvenient and it was difficult to get full attendance. To overcome this difficulty the North Shore Line devised a plan, which it is believed is not used on any other railroad. A passenger car, of the older wooden type, was fitted up suitably for safety meetings. The safety car makes periodical trips along the line, picking up the track laborers at the point they are working. It is then run on to a sidetrack where a meeting is held, the safety director, or a representative, giving the men a short talk on safety measures. At the close of the meeting the men are taken back to their working places and the car proceeds to the point where the next gang is at work. Through this plan a full attendance is assured at each meeting as the men are paid regular time for their attendance.

FIRST AID DRILL TEAM

First Aid is closely allied with safety work. While the aim of safety work is to eliminate accidents among employees, it need not be expected that full realization of that aim can be achieved. Prompt medical assistance, when an accident does occur is essential, and this the North Shore Line provided in 1922 by having the medical department organize a First Aid Drill Team.

The First Aid Drill Team, composed of twenty employees, carefully selected and given a thorough course in first aid work, has demonstrated its value to the road in a number of ways. Members of the team are expert in applying artificial respiration in case of electric shock through the Schafer prone pressure method, they know how to stop a flow of blood, apply splints and bandages in case of fracture, and give other emergency relief measures, pending the arrival of a surgeon. As a result of this knowledge and prompt application of medical skill, the time lost by employees meeting with an accident has been materially reduced and much suffering avoided.

Knowledge on the part of the employees that there is always one or more members of the first aid team near at hand, has a tendency to strengthen the morale of the entire force. The policy of the company is to rotate the members of the team at stated intervals, so that eventually all employees will be given this instruction.

Aside from the practical value of having such a team available in case of accident, the First Aid Drill Team is a good medium through which to advertise the road and cultivate friendly relations with its customers. The team has been called on to give many demonstrations before chambers of commerce, business men's clubs, etc., and these exhibitions keep the name of the company constantly before the public.

WOMEN'S FIRST AID DRILL TEAM

So successful have been the efforts of the First Aid Drill Team in stimulating interest in safety work and improving the morale of the working forces, that recently a number of women in the general offices requested the director of safety to give them instructions in artificial respiration and other simple emergency measures. They volunteered to give their time evenings while taking the course of instructions, and a team was accordingly organized.

This being a novel departure, good feature stories were printed in all the newspapers along the line with large pictures showing the girls in action. In this way a great deal of favorable publicity was obtained for the company.

North Shore First Aid Drill Teams

Development of Good Relations Between Management and Employees

FRANK and open dealing with employees, is the characteristic policy of the management of the North Shore Line. The aim of the management is to make each employee feel that he, or she, is an important part of the organization; that the company is *his* or *her* company; that the future of each employee depends on the success of the company; that all are one family whose purpose is to give the public a service that will insure continued successful operation and consequent steady employment.

In departments in which the employees are organized in unions, the principle of collective bargaining is recognized, and wages and working conditions are established through joint conference. In other departments where no union organization exists, a liberal policy is followed, under which wages and working conditions are made as agreeable to employees as is consistent with management of conservative type.

That this policy is successful is shown by the fact that the North Shore Line, under the present management, has had no labor difficulties to interfere with its continuous operation. That there exists a spirit of co-operation between the management and the employees, has been proved in many emergencies, such as severe snow storms or other unusual and unforeseen circumstances, when all employees have worked night and day, without a murmur, in order that trains might be kept moving without interruption and the public given the service to which it has become accustomed.

Further proof of a spirit of co-operation might be shown in hundreds of letters from patrons of the road commenting on the good work of employees, and commenting on their courtesy and helpfulness to passengers.

EDUCATION OF EMPLOYEES

In line with the policy of frank and open dealing with employees referred to, the management of the North Shore Line believes it essential to give every employee an opportunity to become acquainted with, and to understand the business principles which govern every corporation. Employees in the transportation department of a comparatively small railroad like the North Shore Line, see trains well filled with passengers, or other evidence of seeming prosperity. Unless they understand something of the business end of the enterprise, something of the financial problems with which every corporation has to deal, they are apt to form erroneous impressions, which tend to produce unrest and discontent.

With that thought in mind and with the desire to have all employees of the North Shore Line familiar with the business end of the company, the management engaged Ralph E. Heilman, dean of the School of Commerce of Northwestern University, to give a course of ten lectures covering every phase of public utility operation. These lectures were given during the winter of 1922-23, and while it was impossible for all employees to attend them, most of those employed in a supervisory capacity attended and learned a great deal about the business of the company. The fact that the lectures were given by a well-known instructor and authority on such subjects, who had no direct connection with the company, and whose views were in nowise influenced by the company, made them more valuable and convincing than if given by anyone connected with the company.

FINANCIAL ASSISTANCE GIVEN STUDENTS

As a result of the Heilman lectures quite a number of employees wished to take courses in English, mathematics, electricity, etc., at Northwestern University, or other educational institutions, to advance themselves in their particular fields of endeavor. This laudable ambition was encouraged by the management and announcement made that all employees who took extension courses at any educational institution, would have one-half the tuition fee refunded them by the company upon presentation of proof that they had completed the course. A number of the employees are now taking such courses.

PUBLIC SPEAKING CLASSES

Whether due to the stimulus in an educational way of the Heilman lectures, or some other cause, employees of the North Shore Line have recently shown a keen desire for self-improvement. One such activity was the organization of classes in public speaking. During the spring and early summer, four such classes were organized, one of them composed of women employees. The employees attending the classes in public speaking were regular attendants at the Heilman lectures. Second in importance to acquiring correct information about the affairs of the company, is the ability to impart that information to others, and the classes in public speaking are intended to supply that requirement.

EMPLOYEES' MUTUAL BENEFIT ASSOCIATION

An active Employees' Mutual Benefit Association exists on the North Shore Line, to which about 1,000 of the estimated 1,200 employees eligible to membership belong. An active campaign conducted in the spring of 1923 resulted in adding more than 200 members to the association.

The association is financed by a payment of $1 a month per member, to which a contribution of 50 cents a member is added by the company. Liberal sick and death benefits are paid and the association in the two and a half years of its existence has built up a surplus of $8,000, which is invested in government bonds.

The association is an important factor in fostering friendly relations between the management and the employees.

AMERICANIZATION WORK

An important phase of the educational work carried on among its employees by the North Shore Line, is what is known as Americanization work. As in the case of all railroads, most of the men employed as track laborers are of foreign birth. Generally speaking they are illiterate, many of them being unable to read or write the language of their native country.

When it was decided that something should be done for the improvement of these men, the first step was a survey to ascertain the facts. This survey showed that of 129 alien track laborers employed at that particular time, thirty-seven could not read or write their native language, twenty-nine could not speak English at all and the others very imperfectly, eighty-two could not write English and seventy-five could not read it. Of the entire group, 101 were not American citizens and only forty-four had declared their intentions of becoming citizens.

The company at once employed an experienced man as a director of education and Americanization. Evening schools were established in buildings furnished by the company at convenient points along the line. Four classes in English were organized and later a class for foremen. Most of the men evinced keen interest in the work and within a few weeks all those attending the classes were able to write simple sentences in English. Some difficulty later was experienced in getting the foremen to attend the school. They were mostly middle-aged men and the idea of attending school did not appeal to them.

In order to overcome this objection the class was changed to a foreman's "club," which elected its own officers and conducted its own meetings. Changing the name did not materially change the nature of the class. Instruction in English continued at the club meetings, practical lectures were given on various phases of the work, and cigars and lunches were provided by the company.

RECREATIONAL FEATURES

To sustain interest in the evening classes, it was found necessary to introduce some recreational features such as horseshoe pitching contests, moving pictures, entertainments and floating libraries, the books for which were obtained from public libraries in cities along the line. This work has made a deep impression upon the men. The improvement is noticeable in the reports on work made at frequent intervals by foremen and in the desire of the men to continue in the service of the company. The "turnover" in this class of labor has shown a marked decrease since the educational work began.

In connection with teaching the alien workmen the English language, they were given lessons in American citizenship. To those who had not declared their intentions, the advantages of becoming American citizens were explained. Arrangements were made with the courts in Waukegan, Kenosha, Racine and Milwaukee to receive applications for citizenship on a certain date, which was designated "first paper" day. Practically all the men eligible applied for their first papers on that day. The work was followed up and those who previously had their first papers were given assistance in becoming full citizens. This educational and Americanization work is being continued as one of the regular activities of the North Shore Line.

HOUSING CONDITIONS OF TRACK LABORERS IMPROVED

As a part of the educational work among the track laborers, an investigation was made of the conditions under which they lived in section houses. It was found that some of the section houses were in an unsanitary condition and immediate improvements were made. The company's visiting nurse was sent to the section houses to explain personal hygiene and the necessity for maintaining clean sanitary surroundings. All this work has tended to improve morale and strengthen the loyalty of the employees to the company.

PLACEMENT SERVICE

Another policy adopted by the North Shore Line which tends to promote good relations, is what is known as "placement" service. If an employee fails to make good in one position, he is placed in another and another, until a position is found where he will fit. It is the policy of fitting the man to the job. This policy is based on the theory that the ordinary human being will make good somewhere, if the proper niche for him is found. It inspires loyalty to the company, as the employee feels that he will be given every opportunity to make good.

HOME BUILDING

Employees desirous of building a home are assisted by the company to the extent of procuring plans and specifications, estimates on the cost of various materials and expert advice on the most improved methods of construction.

SERVICE COMMITTEE DEALS WITH COMPLAINTS

In March, 1923, the management created a "service committee," offering a series of money prizes to the employees who would offer the best suggestions during the year for improving the service. The thought which prompted this offer was that the employees constantly come in contact with passengers and shippers. If they should hear a criticism of some detail of operation, the management wishes them to be in a position to assure the complaining customer that the matter complained of will be attended to immediately. Report is made of the criticism to the service committee and immediate action is taken to have the cause of the complaint removed. This plan tends to make the employees alert and watchful and to give them a sense of responsibility. They are made to feel that anything which affects the company is their personal concern and that the management appreciates any suggestion that they may offer in the way of improvement.

SOCIAL ACTIVITIES

The North Shore Line encourages athletic sports and social activities among its employees, providing facilities for meetings, commissary service, and financial assistance. Within the last year a tennis court was laid out. Last Spring the North Shore Line Club was organized by the employees to direct social and athletic activities. Soon after its organization the club undertook the publication of *The Highball*, a monthly paper to serve as a mouthpiece for the club's activities. After two issues of the paper, the club found the cost was more than it could carry and the company assisted by having its publicity department take charge of the publication and pay the bills for printing. Each year the employees gave a field day and also one or two theatrical performances. They have a bowling team and a ball team, a post of the American Legion, a Company Section of the A. E. R. A., and other activities. A feature of the social side is the annual reunion of employees.

The reunion is held in some large hall rented by the company and all the employees and their families are invited. It begins at noon and lasts until midnight to give all the employees a chance to attend. The company provides a turkey dinner at noon and supper in the evening. It engages professional entertainers and an orchestra. These entertainments are attended by all the officials of the company, who mingle with the employees, and help to create the feeling that all are one big family.

The North Shore Line Station at Kenosha, Wis. This Picture Was Run in the Brief with the Caption "Popularizing Service by Building Artistic Stations"

Special Accomplishments that Reduce the Cost of New Capital

THE continually increasing revenues of the North Shore Line, which are the determining factor in the life and success of the property, make necessary large capital expenditures. Until recently, when the company completed a flexible financing plan, we were unable to obtain the required capital at a reasonable cost. However, during the war period, when obtaining capital was very difficult, the company raised seven million dollars, and the increased earnings made possible by the new capital put into the property, enabled the North Shore Company to improve its credit and further enhance its reputation for good service and reliability.

When the properties were acquired by the present management, there was no working capital—no power to issue junior securities, and a closed mortgage on the properties limiting the bond issue to ten million dollars, and limiting the interest rate.

The new financial structure makes it possible for the company to finance its growing needs through the sale of mortgage securities and junior securities.

The elastic financing plan will also enable the company to obtain capital for betterments at a materially reduced cost.

One of the most important features of the plan is that we will be able to maintain the proper relationship between the funded debt and the capital stock.

Another important point is the opportunity to interest consumers and employees in becoming part owners in the property through the purchase of stock.

Automobile Accidents from Transportation Standpoint[*]

By Ralph W. Emerson
General Manager
Cleveland Railway

Not More than a Fifth of Collisions Are Due to Negligence of Motormen—Safety Instruction Is Valuable Aid —Parking Rules Should Be Adhered to—Better Enforcement of Legislation Urged

Ralph W. Emerson

THE thing that makes automobile accidents so vital is their appalling increase. In Cleveland the increase was from 1,803 collisions in 1912 to 10,353 ten years later, in 1922, an increase of over 400 per cent for the period. This is typical of most properties throughout the country and out of all proportion to the variation in any other class of accidents.

The increase in the use of the pleasure vehicle and motor truck has been so rapid and the resultant changes in methods for dealing with this new problem have followed each other in such rapid succession that transportation men as well as claims men have only been able to gasp for breath and wonder what might be done to check the apparently inevitable increase in the number of collisions with autos. Consequiently most efforts have been spasmodic and tended to deal with present conditions rather than to propose a scheme to cover the entire question and which would be satisfactory for a considerable period of time. The inauguration of each of the various remedies tried seemed to check the onward and upward rush of automobile accidents, but its effect was only momentary. Something was lacking.

The Safety Council has been very active in studying conditions and seeking a solution. Much constructive work has been done through campaigns of education, through bulletins and letters, and to them must be given much credit for the bringing together of the various civic interests of the community for the study of this perplexing problem. What is regarded by many as one of the most constructive activities fostered by the Safety Council is the work carried on among the school children in collaboration with the Board of Education. Very remarkable results have been obtained in educating these auto drivers of the future and inculcating in these young minds the habit of thinking safety.

There are at present eighty-two cities having children's safety organizations. Children are interested in the work as presented in the Cleveland schools, where a text-book on safety instruction for grades one to six has been adopted. The manual provides for forty-five minutes a week of safety study in the kindergarten and the first four grades. The fifth and sixth grades have been organized as junior safety councils. As an indication of the beneficial results of this constructive work, traffic accidents to school children reduced 50 per cent last year and "Own Fault" accidents 82 per cent. Boy Scout training now includes instructions in safe conduct at home and abroad.

What have transportation companies done within their own ranks toward combating collisions with automobiles? Many of the companies have instituted campaigns of education, reaching their men through bulletins together with talks on accident prevention and endeavoring to win the co-operation and earnest efforts of their employees by an appeal to the heart rather than to the head.

The good results which may be attained by such work will be nullified and short-lived unless followed up with strict, fair and impartial discipline. C. B. Proctor, claims agent of the Memphis Street Railway, strikes the nail on the head when he says "Safety work is important, but it is secondary to discipline, unhesitatingly and impartially applied."

In Cleveland certain rules for safe operation have been laid before the men either by bulletins or talks. A strict account is kept of each operator and for the first violation of a safety rule he is called into the office and reprimanded. For any violation beyond the first he is suspended from his work for a number of days, depending upon the seriousness of the violation. This same discipline is administered for other violations.

It is safe to assume that not over 15 per cent or 20 per cent of collisions with automobiles are due to negligence on the part of motormen, notwithstanding the fact that they are driving vehicles weighing between 20 and 25 tons and upon fixed rails. In Cleveland of the 135 traffic accidents in 1922 which resulted fatally there were but eighteen in which a street car was involved and but five in which the liability rested solely upon the traction company. During the same period 124 persons were killed in motor vehicle accidents. It is interesting to note that more fatalities resulted from horse-drawn vehicles and bicycles than street cars in the same year.

One of the things which contributes to the development of such efficiency among the men is the fact that in the first place they are schooled as soon as their applications are accepted, which schooling involves instruction in the mechanical and electrical apparatus which they are to operate. It involves listening to talks by the superintendent of employment bearing directly on the automobile hazard and instructions as to the safe way of combating this hazard on the street.

After ten days of breaking in under competent instructors these men are then assigned to runs and from that time on they are put on their own responsibility, with the exception that they are under the watchful eyes of the chief instructors whose duty it is to ride their cars in citizens' clothes and observe the work of the operator. Should these new men show evidence of carelessness, nervousness, indifference or unsafe practices of any kind the chief instructor makes himself known to them and shows them wherein they are wrong.

Up to this time the new employee is more of a liability than an asset. The company has spent time, money and effort to enable him to acquit himself creditably in his new work, and in return we expect these new employees to render careful, faithful service to their employer. Probably 85 per cent of all employees will do this. The other 15 per cent represent that portion of our organization which gets us into trouble through accidents, and for that reason strict discipline must be applied and a final effort made to win these men over and make them good employees, not only for the safety of others but themselves as well.

If we assume that most automobile drivers are careful to begin with, we have only to deal with a small minority who persist in unsafe and reckless driving. It might be wise and beneficial to have established in the municipality or state a school of instruction, attendance at which would be compulsory for those who by their records show themselves to be incompetent drivers.

It seems to me that the administration of the same kind of discipline to these drivers as is meted out by traction companies to their employees would go farther than any other agency in cutting down the number of preventable accidents. If the municipalities would come to the realization of the importance of disciplining the reckless without fear or favor and let it be known that there is no escaping through friendship, pull or even worse, the administration of our traffic courts would be respected by the careful driver and law-abiding citizen and equally feared by the careless.

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[*] Abstract of a paper before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 8-11, 1923.

In Cleveland we have been very fortunate in the operation of a highly efficient traffic court. During the administration of Judge A. R. Corlett, who pioneered in sentencing speeders and reckless drivers to the workhouse, this court was put on a firm, businesslike and impartial basis. The fact that these sentences were meted out without fear or favor, regardless of political affiliation, friendship or any other consideration, soon caused public sentiment to rally to the support of Judge Corlett's policy. Whether or not we favor the imposition of workhouse sentences, the fact remains that the inauguration of this means of combating the reckless and intoxicated driver has done much to eliminate the small portion of automobile drivers guilty of such offenses. In 1922 of the 13,326 arrests for violations there were 12,557 convictions, or 94.22 per cent. In the first three months of this year the ratio of convictions to arrests is 96.65 per cent.

A careful analysis of data collected throughout the country reveals the fact that the precentage of accidents to motor vehicles operated is steadily decreasing. For instance, in the year 1922 in Cleveland there was a reduction of 21.6 per cent in accidents per thousand motor vehicles over the year 1919. To put this in another form, in the city of Cleveland there was an increase of 68 per cent in licensed automobiles in the four-year period 1919 to 1922 inclusive, yet in the same period automobile collisions with street cars increased only 28 per cent.

There are several causes which may have contributed to this favorable showing. Drivers are more familiar with their cars and know better what they can and cannot do with them. They are more experienced due to the longer period of time over which they have operated automobiles. They have been influenced more or less by accident prevention propaganda. They are influenced by the increased severity of discipline meted out in our courts and, lastly, the accident rate has been decreased by reason of the fact that automobile congestion is becoming more acute day by day and drivers are forced to operate their cars at a lower rate of speed, thereby being better enabled to make a quick stop when emergency arises.

This lower speed at which autos have been forced to operate is probably the principal reason for this decrease in the accident rate. By the very force of their own numbers they are helping to solve the problem of accidents. This will continue until the saturation point has been reached—whatever that is.

This phase of the question is an encouraging one to the claims man rather than a discouraging one. It shows that education, discipline and the other factors enumerated are surely cutting down not only the accident rate but the severity of the accidents which occur.

The problem of the operating man, on the other hand, is becoming increasingly difficult. His duty is not only to transport passengers safely but also expeditiously. If we wish to retain the patronage of that portion of the public which uses street cars as a means of transportation, there must be no decrease in the speed with which we deliver them to their destination.

How is this to be accomplished? Obviously, one solution is the separation of traffic by creating "street car streets" and "automobile boulevards."

Undoubtedly our larger cities, at least where physically possible, must come to the separation of traffic by the establishing of auto boulevards. This problem is now up in Cleveland, where the saturation point has been reached on many thoroughfares. The creation of main thoroughfares whereon street cars as well as autos have the right-of-way is another means of enabling transportation companies to render rapid and efficient service safely.

The Ohio State Legislature at its last winter's session passed a uniform traffic law which became effective July 26 of this year. This co-ordinates the conflicting rules of the road in various communities. Section 6,310 reads as follows:

> For the purpose of enforcing the road regulations referred to in this chapter, the main thoroughfare shall be understood to mean all sections of public road and highways on which street cars or electric cars run.
>
> Vehicles and street cars going on main thoroughfares shall have the right of way over those going on intersecting thoroughfares.
>
> A vehicle joining the flow of traffic on a road or highway from a standing position, an alley, a building or private property, shall yield the right of way to all other vehicles.

Thus we have some relief from collisions occurring at intersections where the responsibility has heretofore been equally divided.

Another condition which introduces a serious hazard and interferes with the maintaining of schedules is the parking of automobiles in the congested sections.

The writer has attended meetings of the traffic committee founded by the city council and composed of representatives of the various civic institutions and organizations. One of their meetings was devoted entirely to a discussion of downtown parking. The only thing the committee agreed on after a long and arduous meeting was that this matter should be left alone. It was suggested by the writer, in order to start discussion, that all parking of automobiles should be prohibited upon every downtown thoroughfare upon which a car line operates. Representatives of the wholesale merchants, retail merchants, taxi drivers and various other organizations presented their arguments why this should not be done. The only personal satisfaction which resulted from this meeting was a statement by the secretary of the Cleveland Automobile Club, who was also chairman of the meeting, that he believed that ultimately this would have to come, but that the suggestion was premature by a year or two.

We do have in Cleveland a traffic code which prohibits the parking of automobiles on certain main thoroughfares on the city-bound side in the morning from 8 a.m. until 9:30 a.m. and on the out-bound side between 4:30 p.m. and 6 p.m. This is intended, of course, to give the full width of the street for the use of moving vehicles.

As a matter of fact, parking in these hours is not less than any other hours of the day.

The provision of one hour parking on certain streets in the congested districts means nothing so far as accelerating the movement of traffic is concerned. A satisfactory, expeditious and safe movement of street cars and traffic in the busy, congested sections of our cities must ultimately do away with the use of these streets as a public garage and the time is coming, if it is not already here, when merchants must realize that their business will be enhanced rather than retarded by the quicker movement of customers to and from their stores and the ease with which they may reach the sidewalk after alighting from their automobiles or street cars.

At the last session of the Ohio State Legislature another bill was passed which we feel has been a distinct step forward, particularly in protecting the investment and the very life itself of interurban properties, namely, "the motor truck and bus law of the state of Ohio." This bill empowers the Public Utilities Commission to supervise and regulate each motor transportation company, whether passenger or freight, to fix, alter and regulate rates; to regulate service and safety of such companies; to prescribe safety regulations and designate stops for service and safety on established routes; to require the filing of an annual and other reports and to provide uniform accounting.

The fee charged by the state runs from $40 per year to $230 per year, depending upon the number of passengers carried. Trucks carrying freight and express are listed on a tonnage basis, the yearly fee running from $40 to $200.

The operation of this law will drive out the irresponsible and careless operators, and to that extent reduce the hazards of the road. There is nothing in this bill, however, which limits the size of trucks.

The ultimate solution of the problem of automobile transportation and the curbing of accidents which result therefrom will require a great many years for its fulfillment in most of our communities. In our large communities it will require city planning for the reason that our streets, as laid out, were never intended to be taxed as they are at present. It is going to mean the establishment of more thoroughfares, which provide for the proper separation of the various means of transportation.

The problem confronting our municipalities is not only to deal with the problem as it now exists and to furnish remedies which may for a short time relieve a bad situation, but at the same time they must plan on a larger and more comprehensive scale which will meet the requirements of the road imposed by the universal use of the automobile, whose numbers have increased in five years from 6,000,000 to more than 12,000,000 in the country.

In the meantime, all that we can do is to follow up, possibly a little more systematically and thoroughly than we have in the past, the choice of our employees, their thorough and painstaking education, promulgation of accident prevention work, etc., but also not to lose sight of the fact that old-fashioned discipline, fairly and impartially administered, will do more for curbing automobile accidents than all the various theoretical methods that have been suggested.

On the part of municipalities, more strict enforcement of the existing traffic laws, which will no doubt require the employment of more men in the traffic departments, which are woefully and universally undermanned, rather than the passage of more legislation, which will be equally helpless without the man-power to enforce it, and for them to work out a harmonious relationship such as we have in Cleveland between the courts, the police prosecutor and the police department, administering the same fair and impartial discipline to the reckless and intoxicated automobile drivers which we are trying to administer in the operation of our street cars.

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*The Utility Accountant's Obligation to the Public**

By Dwight N. Lewis
President National Association of
Railway and Utility Commissioners

While Accounting Work Is Seldom Spectacular, It Is Indispensable to Proper Utility Regulation—Accurate Figures Can Help in Combating Demagoguery

FIGURES are such soulless things, in and of themselves, that it takes a real genius to so clothe them with spiritual attributes that they become alive, attention-compelling and decidedly interesting. It is recognized now that not only do figures not lie, but the man behind the figures must play fair with the arrangement of them. To be sure, there may yet be found those who, for a present advantage, will distort accounts so that the figures presented do not tell the story as it should be told. There are yet those who, for the purpose of befuddling an issue, might, instead of saying two plus two equals four, put it something like this—78 plus two divided by four squared minus three plus two equals four. Correct, sure, but the general public would have little knowledge of what was going on.

Accounting work is seldom spectacular, though I must confess I have seen some wonderfully spectacular figures coming out of the smoke funnels of utility accountants' engines. Upon you men devolves the duty of so keeping accounts that the owners and managers of the property may know, day after day, the actual results of operation. Upon the care with which you properly allocate operating expense, interest and other items of expense to various divisions of the work depend proper readjustments for the betterment of service and the introduction of economies in operation. The public knows little of you or your work. You are like the guards in a football game—we know they're there and most mightily necessary in every play, but it's the backfield or the ends who get the applause or condemnation. I have heard times without number criticisms on the side line (may have indulged in them myself) of how the quarterback or fullback or right end or left end or a halfback ought to play the game, but I've never heard a man presume to criticise a guard. Of course, the analogy is not perfect; analogies never are. We do hear that the statisticians or accountains for public utility companies so manipulate figures as to tell a story different from the whole truth. But you are personally never blamed for it—the rotten management, the dishonest Wall Streeter, or some mythical personage representing the murderous money power, is at fault—and you are merely one of the means used to deceive and defraud the public.

SCIENTIFIC ACCOUNTING INDISPENSABLE

Scientific accounting is indispensable to the proper regulation of public utility companies. This basic truth is well recognized. I have heard the late Federal Judge McPherson many times declare that a regulating body had no standing in his court, if it fixed rates or ordered service without knowing, or at least making an honest effort to learn, the various items of cost. The state of Iowa won its express rate case in his court because the express companies had declined to furnish the information as to costs as asked for by the commission.

Bookkeepers are not necessarily accountants, and it is only in comparatively recent years that the fundamental importance of careful accounting has been recognized. Good accounting is a careful record of essential facts of business operation, the essential operating facts necessary both for the operator of a publc utility and the regulator; the recording of essential facts and not the management of property. The absence of proper accounting in the early stages of railroad development proved a serious handicap to the Interstate Commerce Commission. Many of the earlier records were entirely lost or, through their indefiniteness and unreliability, were misleading or worthless.

When I was a boy I became interested in the annual reports of railroad companies to state and Federal commissions. I was early impressed with the accuracy of the figures presented and with my utter inability to find a story in them. It was amazing how little the accountants knew of details necessary for a regulating commission to know in order properly to fix rates or otherwise perform their functions as required by law, and what a vast storehouse of knowledge of details these same accountants became when they wanted to use such details in fighting some action of the commissions in the courts. They could not say what proportion of business done was state and what portion interstate while a state commission was attempting to fix a rate, but could afterward tell the court what a sorry job the state commission had made of it by fixing the rates it did, and prove their claims by endless detailed statistics. It is this sort of professional expert that has caused the public to discredit statements made by the accountants for public utility companies.

A regulating board, whether city or state, in order to make its orders stand the test of court procedure, must fix rates based upon cost of service, including a reasonable return on the value of property used in public service, and including a sufficient charge to provide for the cost of retirement of equipment. Cost figures should be actual and some of the cost figures will not be easy to ascertain, and will change from year to year and be different for different localities and different companies. No accountant for a utility company should be party to any system of bookkeeping or accounting which would permit of unreasonable use of the funds of the company or an unreasonable statement of operating conditions.

Public regulation has come to stay. It must be along reasonable lines, in the public interest, and founded on a complete knowledge of practical requirements of regulated industry. Regulation along these lines will do away with the possibility of government or municipal ownership and operation. No real student of a democratic form of government desires to see government ownership and operation.

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*Abstract of a paper before the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 8-11, 1923.

It is the easiest thing in the world to inflame the public mind against any public utility that is monopolistic or nearly so. The utility companies upon which we are most dependent for the necessities and comforts of life are the ones to receive our severest condemnation. We always want to buy cheaper, while at the same time receiving more for our own services. We always want more service for our outgoing dollar, although we are not always so keen to render a greater service for the incoming dollar.

When a demagog wishes to ride into public office and has absolutely no attribute of mind or conscience fitting him for the office, he bases his campaign on hatred for public utilities of one kind or another. United States senators, as well as congressmen, are made by lambasting railroads, mayors, councilmen, even governors, are elected because they declare what rotten institutions water companies, gas companies or street railways are.

A movement which is on foot now, I believe, will have a tendency to cure the worst symptoms of this form of demogoguery and that is public ownership through buying of stocks and interest-bearing securities. I am most heartily in accord with the efforts now being made by public utility companies to promote customer ownership. It goes without saying that when one owns an interest in a going concern the viewpoint changes materially as to the needs of that institution. The more we can induce the men and women of America to own something—to have property interests—the more certain we are that the red radicals will never get a foothold in our beloved republic.

In the meantime—yes for all time—you men have it within your power largely to prevent injustice being done to either the public or the utility companies by the frankness and fairness with which you do your work.

The Preparation of Litigated Claims*

By Edwin F. Livingston

Chief Investigator
Boston Elevated Railway

The] Importance of Having an Adequate System and Experienced, Capable Investigators—Complete Records of All Cases, Properly Filed, Are a Safeguard Against Fake Claimants

Edwin F. Livingston

THE two main requirements for the proper preparation of claims are (a) an adequate system and (b) experienced, capable investigators. Any system of preparing claims that tends to fix the investigator in a groove should be avoided. An investigator may do one thing day after day, but he should be flexible, physically and mentally, capable of making quick adaptations, and alert to all the possibilities of his work. In the preparation of claims a knowledge of the essentials of that branch of the common law and the statute law relating to negligence and damages as applicable to electric railway cases should be possessed and understood by those having to do with the work of preparation. It is also equally necessary and important to keep in close touch with the decisions which, from time to time, are handed down in our cases.

The investigator's work should be laid out for him in the simplest form consistent with the proof wanted, and under a schedule which will avoid multiplicity of work and unnecessary expense. While it is desirable that the chief investigator should indicate specifically the general ground to be covered in the preparation of the case, he should not deprive the investigator of initiative or power of instituting local investigation as to any matter concerning the case which may arise during his field inquiry into the facts. Every alert investigator will find abundance of opportunity in the cases he handles for the exercise of his best efforts and talent.

An Adequate System

The company should provide its investigating department with all practical things within reason to aid it in its work, for instance, the latest, as well as the older, directories of the cities and towns in and near which the company operates cars; also copies of new and the older voting lists, telephone books and other sources of similar information, so that the investigator before he leaves the office may be able to trace people if necessary from one address to another and also enable him to find those who had lived at various addresses at certain times. The company should also keep an index file showing the name and address of all previous claimants, as well as an index showing all present and past employees giving their full names and addresses and the names and addresses of their references. The company should belong to at least one local index bureau or clearance house, where a daily list showing the full name and address of all claimants could be consulted when necessary, and that it should be a member of at least one index bureau of national repute.

The chief investigator should, in addition to the above, keep a record or "dope" cabinet, so called, of all things which were of great importance to his company, but of no importance to other companies. The filing of newspaper clippings at the local index bureau or in the chief investigator's cabinet is always of great assistance, for it often opens up much information of great value. The writer well recalls a case where such a clipping was used some five years after it was filed and it opened the door to information which showed that a woman had two claims at the same time, under two different names and addresses, and that she was connected in many ways with fake claimants.

The dictagraph or dictaphone may have its special field of usefulness and should be furnished by the company when necessary. The subject of photographs is too well known to require much comment here, but an expert photographer who is a practical railroad man should always be at the service of the investigator when needed, as should also an engineer, who could take measurements, make plans and testify in court later, if needed.

Declarations should be promptly obtained after entry day, and when needed, specifications filed, and when answers are received and it is fully known what plaintiff's claim is, searching interrogatories should be filed in all cases of any great importance and should be followed up until they are fully and properly answered.

Passes or identification cards should be furnished investigators so they may readily identify themselves when and wherever needed.

Experienced, Capable Investigators

The successful preparation of litigated claims is nothing more or less than a search for the truth, and to be able to do the work of a first-class investigator one must be intelligent and honest, a hard worker, and willing to pay strict attention to business, a clear, cool-headed person, one capable of sizing up all kinds of people with whom he comes in contact. He must constantly be studying his cases, the people he meets and the locality in which he is working. An investigator should always try to leave a favorable impression with those he does business with so that they will have confidence in him in the future. Even when his work takes him to people of the "underworld" he should strictly keep his word to him. If he will do this and is a good investigator he will often be able to obtain much valuable, honest information. An investigator should be a practical railroad man and often the best results are obtained by promoting a man from the ranks of conductor or motorman. It is highly desirable that the man seek the position rather than the position the man. He should be promoted strictly on his merit for work done. A first-class investigator is not the product of one season. The man who has been in the business many years may continue to learn something about investigation. [The author then gave several illustrations from actual cases to show the difference between a first-class and a poor investigator and their value to the company for whom they work.]

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*Abstract of a paper before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 8-11, 1923.

To prepare cases for trial successfully, one must have first-class investigators. The investigator's job if he hopes to be successful means a great deal of hard work, each man should be paid according to the value of the work he does. Did you ever know of a first-class investigator being paid more than he was worth? I never did, but I have known poor investigators being paid more than they were worth, for a poor investigator is of but little value. An investigator's personal appearance means much and may be a valuable asset to him.

It is very important that a first-class investigator who has had a thorough experience in doing all kinds of the work and is entirely familiar with the operating department, should be furnished as a court assistant to the trial attorney. In the trial of cases this kind of a man is of great value, as he will readily grasp many a situation of which even the best of trial attorneys might not think, or might overlook. I cannot say too much in favor of this kind of a man as a court assistant, but believe the hardest of all positions for an investigator, is where he is required to do plaintiff's history work in a blind case, or where large amounts are asked and the company does not know whether the claim is an honest one or a fake case. In such cases the investigator often has nothing definite on which to work and the success or failure of the case depends on his ability to cope with existing situations and to secure the truth. To do this work well a man must be a constant, hard worker and not become discouraged when he is not able to obtain results. The whole value of first-class investigation will never be fully known, for in some cases where the whole truth is never found out the company never knew what it lost as a result of its incomplete investigation. Then, again, in the case where the fake claimant is thoroughly shown up, the investigation in many cases helps to stop other fake claims, even in some instances where claimants are waiting to see what the outcome of a certain case may be, and if it is fatal to claimant, the claim is never made.

Of course there are many cases where the injury and nature of the accident are not, to any great extent, debatable, and such cases call for little, if any, fine investigation work, the only problem being one for the trial attorney, to see that the questions of law or fact are properly presented to the court or jury. It is largely in cases where doubt as to the happening of the alleged accident is raised or fraud suspected as to the genuineness of the alleged injury that the talents of the trained investigator are required.

It has been the experience of the writer that a man who can not only obtain statements from plaintiffs and witnesses but who can also get a record in the handwriting of the person making the statement, showing that statement is correct and that they have read it over, is a valuable man. Statements unsigned and not showing that they have been read over by claimant or witness are of but little value compared to those which have been properly taken.

*Proposed Code of Ethics of the Claims Association**

Drafted by
Russell A. Sears
General Claims Attorney
Boston Elevated Railway Company

Russell A. Sears

Some of the Leading Principles Which Should Guide Claims Men and All Other Persons in Similar Positions

THE street railway is comparatively a new industry and like all conveniences of modern life brought with it some of life's inconveniences and hazards. In the early days the president, the manager, the superintendent or attorneys undertook the adjustment of claims against their railway until the unprecedented growth of this form of transportation and the alarming increase in injuries called for those of special fitting and experience to undertake the work of this character. Then was born the claims agent, who has finally, it is hoped, established himself as a respected, self-respecting and useful member of the business world. From a few dozen of them spread throughout the country in the early nineties, they have grown to hundreds, and with the influx of similar situations in all industries now number themselves in the thousands.

These thousand of claims agents have conducted their business without standardization or without a declaration of any basic principle which would seem to meet with the approval of all concerned. Believing that the time has now arrived when this association, representing one of the greatest industries of the country, whose members desire under all the circumstances to be just and honorable, should gather together some of the leading principles which should guide its members and all other persons in similar positions, it hereby declares and adopts the following sections as its Code of Ethics:

I.

Code as Proposed

It is the duty of the claims agent to serve his company with absolute fidelity; entrusted as he must be with wide latitude of discretion in the discharge of his duties, many of which must be accepted on his unconfirmed statement, he must at all times be faithful to the interests of his employer. The nature of the business which he transacts is such that temptations toward dishonesty abound; he is subject to approach or evil suggestions from those whom no code of morals could bind; he must often in emergency act quickly and make decisions which afterthought may not confirm as wise; he may be imposed upon and misled by those of greater adroitness or who are untruthful or intentionally fraudulent. The test should be fidelity to his company under all circumstances, leaving to others the results of dishonesty, and for himself his future advancement based upon his honesty and fair dealings.

II.

The claims agent in adjusting a claim should be fair and just; while he may assume that a person of mature age will care for his own interests, the representative of the company should not by fallacious reasoning or cunning seek to reduce the claim below a reasonable amount, much less should he seek to take advantage of ignorance or inexperience. It is his duty in dealing with claimants or their representatives to disclose clearly the fact that he represents his company and never by words, actions or intimations lead those with whom he deals to believe him to occupy any other capacity than his true one. When it is apparent that the injuries were sustained through the negligence of the company and that the claimant was not at fault, the law considers the injured party entitled to proper payment. The law favors compromises and protects those attempting to adjust their differences from any prejudicial inference.

Settlement should not be effected while the claimant is in pain or anguish to the extent that his mind is not clear. Adjustments made under circumstances when the claimant is not in a condition to intelligently transact business are odious and for the reputation of the company and the good name of the claims agent should be avoided, however great the temptation.

Wholly fraudulent cases under no circumstances should be compromised, however great is the expense necessary for resistance. Those guilty of perpetration or attempting to perpetrate a fraud on the company should, if the evidence warrants, be turned over to the public authorities for prosecution. This is a duty owed the community.

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III.

In taking a written statement from the injured person, the injured party's statement and not that of the claims agent should be made. Such statements should be as full as desired by either party and should be honestly and accurately transscribed in writing, and the person making the statement, if he is asked to sign the same, informed of the nature and effect of the statement he is signing. The taking of written statements has often placed the claims agent in an embarrassing position, hence all precaution should be taken to surround the transaction with evidence of good faith.

IV.

When it becomes desirable to obtain the statements of witnesses, the truth only should be sought and it is the moral duty of all persons to be truthful in matters pertaining to the rights of their fellow citizens; to whom such statements are made is immaterial. A true and accurate statement should be taken and neither directly nor indirectly should any improper suggestion or intimation of reward be made by the company's representative to any witness.

V.

If a claims agent is called upon to attend court, either to assist counsel or to testify, his conduct should be deferential to court, counsel and all concerned. To attempt to curry favor with the judge, to meddle with the drawing of jurors or to directly or indirectly influence the verdict is wrong. There is very little satisfaction in a victory gained by unfair methods.

VI.

It is the duty of the claims agent who is intrusted with the privilege of employing his associates to choose men and women of good moral character. A company soon becomes favorably known if its representatives stand as men of integrity and honor in the community. No person, however alert, cunning or efficient in the business, should be employed unless this standard of character is fulfilled. When a person new to the particular company is employed to investigate or adjust claims he should be thoroughly instructed as to the policy of the company and should be required to live up to it.

VII.

In all his transactions with the company the strictest accuracy and honesty should prevail. No meretricious report, no unsubstantiated self-serving figures or accounts should be submitted. A candid report best serves the claims agent.

VIII.

The claims agent should deal only with the injured person or his properly authorized attorney or agent. To deal with one who has solicited the case from the injured person is to ignore the law and participate in an odious practice. In nearly all the states laws have been enacted against the solicitation of accident cases and in all civilized places such practice has been condemned. To recognize a person who has solicited a case by discussion or adjustment is participating in a wrong and is calculated to increase the growth of an evil situation. It is proper to discuss or adjust a case directly with the injured person without conferring with or notice to any person who has illegally or improperly procured authority to act as the injured person's representative.

IX.

When it becomes desirable to have a medical report of the condition of the injured person, only surgeons or physicians of competency and high standing should be employed. Such doctors should understand clearly that only a report of the true physical condition of the examined person is expected or desired.

Such reports, if prejudiced or unfair, mislead the adjusting authority and are to be condemned as seldom bringing even temporary satisfactory results.

X.

The reports of the accident made by the employees, being generally the starting point of the claims agent's duty, should be frank and truthful and all employees should thoroughly understand that they best serve their company and themselves by making such reports. Rules should be formulated and promulgated, according to each company's method of bringing such notice to its employees, stating clearly that the true facts only are desired in such reports.

XI.

The street railways are quasi-public corporations to the support and success of which the public contributes its money. The return which the public has a right to expect is good service at reasonable cost. All payments made by the claims agent in the adjustment of cases are charged to the cost of service. It therefore follows that sound judgment should be exercised in these payments. Unjustifiable or over-liberal payments should be avoided. The public has a right to expect the application of sound business principles in all branches and departments of the street railway which it supports.

Even-handed justice, as far as the claims agent can see it, should be administered to all. The rich or powerful, those of political influence or holding political positions, should be treated on the same basis as those in humbler life. Pain or suffering—or the law—make no distinction as to personages.

XII.

The claims agent, having unusual opportunities to witness the effect of accidents both to the individual injured and the cost that results therefrom, should by all means in his power advocate the adoption of safe methods and practices on the part of his company and should unceasingly work with his management in the prevention of the loss of life, suffering and money. This is one of the highest duties of the claims man and commends itself to the approval of all. He, too, has the unusual opportunity of witnessing the evils to the community resulting from the practice of soliciting personal injury cases. It is his duty insomuch as the practice is condemned by all to do what he can to discourage the same by the advocacy of legislation or other means tending to stop it and properly to punish those who indulge in it.

CONCLUSION

In its last analysis, the duty of the claims agent toward his company, the injured person and the public resolves itself, like all human action, to nothing more or less than living up to the Golden Rule. The claims agent who transgresses the settled rules of procedure in his business offends against his company, the community and his brethren.

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*Construction Cost Accounts**

By Weston J. Hibbs

Treasurer
U. G. I. Contracting Company

Exact Principles Govern Cost Keeping—Accuracy of Results Depends on the Skill with Which They Are Applied—The Accounting System Used by the Speaker Is Described

Weston J. Hibbs

A GOOD construction cost system should function in such a manner so as to produce the following results: (1) To enable those in charge of the work to have revealed to them all the cost of the work as it progresses, so that the figures will assist in pointing out efficiencies and inefficiencies promptly and in time for remedial and productive action, thus helping to save time and money instead of simply accounting for and analyzing the outgo after it has been spent; (2) to permit readily of a financial audit; (3) to divide the various elements of cost so as to permit of an accurate detailed record of all the multitudinous parts of the work; (4) to be sound in theory and accurate in practice; (5) last but not least, not too expensive to operate, nor too difficult to keep accurate.

The fundamental principles of cost keeping are as positive and exact as the fundamentals of mathematics and every variation from these principles results in error. Accuracy of the results are predicated on the degree to which these principles are skillfully applied.

These fundamental principles may be defined as follows:

1. *The Principle of Cost Definition.*—The cost of an item of product is the sum of the expenses involved in its production and distribution up to any predetermined point. It is the price at which an article may be sold without either loss or gain to the seller.

2. *The Principle of Element Definition.*—Each cost element is definite in amount, purpose and object. An element of cost is any expense incurred. Expenses may be classified as normal or abnormal, normal expenses being those incurred directly as the result of premeditation or planning with a view of obtaining some definite result.

Abnormal expenses are incurred as a result of unpremeditated contingencies of business such as accidents, fires, carelessness, or other causes which were not definitely planned. Expenses having a single beneficiary are "direct" expenses; those having two or more beneficiaries are "indirect" expenses and require distribution.

3. *The Principle of Expense Grouping.*—Indirect expenses may be grouped for simultaneous distribution only when their benefits are measurable by a common unit and their beneficiaries participate in identical ratios. The combining of all indirect expense items in a single group and designating them as overhead, burden, or general expense, not only obscures the purposes and benefits of these expenditures but

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also renders their correct distribution impossible.

4. *The Principle of Expense Distribution.*—In the distribution of indirect expenses, single or grouped, the proportions of benefits conferred indicate the proportions of the expense or expense group total, chargeable to beneficiaries. If it is wrong for a merchant to charge to the account of one customer the cost of goods delivered to another, it is equally wrong for the manufacturer to charge against an item of product made for one customer any part of the expenses incurred in production of an item made for another.

5. *The Principle of Contingent Expense.* — Contingent expenses, such as repairs to equipment, shrinkages in values, losses by error in workmanship and design, sick and absent, and vacation expenses, constitute legitimate charges against production. The causes of such expenses and losses generally serve to indicate the character of the resulting benefits or losses for the purpose of applying the rule for their distribution. This system is now in use by the company with which the writer is associated and has been brought about by the necessity and the requirements of the business.

These requirements are very severe in that most of the construction work done by the company is on some basis in which the price is determined by the cost, and that "cost" must be such a cost as will justify itself in an audit by the customer. This system has stood numberless audits and has successfully weathered all storms.

It seems to me that logically the first step of a cost system, is to define definitely "What is Cost?" There are many definitions of cost, some of which endeavor to state specifically what items constitute cost, but it has always appeared to me that for a definition of cost the best way to make it is not to say what it includes but to say what it does not include.

In our system we define cost as "All expenses incurred in carrying out the provisions of the agreement except the following: Salaries of the officers of the contracting company, purchasing expenses, new business and selling expenses, interest and legal expenses."

We exclude the above five elements of expense from our cost, because we admit our inability to properly allocate these to the various jobs and also because the question of the amounts disbursed for certain of these expenses, particularly such as new business and selling expenses, might in an audit be readily criticised.

Having determined upon our principles and definition of cost, our next step in the work is to prepare an estimate for the work. An estimate, however, is nothing more than the combination of a number of guesses of the ultimate cost of various parts of the work, and its accuracy depends on the knowledge and accurate work of the guesser. Therefore, we built up our estimates by detailing these guesses and calling each little guess or division of the work a sub-account.

Actual expenditures in the field may be divided into the four general divisions of material, labor, freight and cartage, and miscellaneous.

I show freight and cartage as a distinct division owing to the fact that this is a cost which may be very materially affected by the location of the work both as regards its surroundings, distance from points of shipments, and of deliveries.

In some cost systems only the total labor and total material costs are shown, but I personally cannot see that this information is of much value. What we want to know is what is the cost of the physical divisions of the work. For instance, what is the cost of the foundations; what is the cost of excavations; what is the cost of clearing the site?

SUB-ACCOUNTS CLARIFY RECORDS

Owing to the demands of the estimator, sub-accounts are quite numerous, but the more there are, the easier it is to compare the resultant cost with the original estimate and also to ascertain more readily the reason for over-runs and under-runs of the estimated cost. It also assists those in charge to see at a glance during the progress of the work the likelihood of each division or sub-account of the work exceeding its budget.

The usual practice is to open in the ledgers an account to represent the total cost of the job and keep memorandum ledgers showing the details of the cost divided into sub-accounts. This will simplify bookkeeping very materially and the memorandum ledgers may be kept in as much detail as desirable. If in these memorandum ledgers an explanation of each item of cost is written, a permanent record will exist for future information.

In the system I am outlining this method is followed, and at the end of each month a typewritten copy of the memorandum ledger entries made during the month is prepared for the customer so that the customer has in his office complete detailed costs and is able to compare them with the original estimate in case of an over-run or under-run.

Care should be taken by the contractor to allocate to each job such expenditures as are caused by the job and to charge to it only such expenditures. This means that the contractor's home office and engineering force should require its employees to keep time vouchers so as properly to allocate their time.

Care should be taken by the contractor to see that there is charged to the job the cost of only the work covered in the estimate. If the customer desires any work done which is not included in the estimate, it should be done under a separate job number and its cost kept separate. If you do not follow this plan it is very difficult to make comparisons of the resultant cost with the original estimate. This is a very important point and should be very carefully followed out.

Also, care should be exercised to see that each contract is charged with its proper costs and only its proper cost for the use of the contractor's tools and equipment, for the use of the contractor's standard drawings, patterns and molds, etc. These charges should be based on some fair equitable plan, the basis of which is the benefits in service or commodity to the job.

There are a few expenditures of the contractor which cannot be allocated direct to a contract. An illustration of this would be time of clerks in the contractor's home office not chargeable to a particular contract, rent of the contractor's home office, and also the cost of vacations granted to employees.

It is suggested that such expenses be combined under some general heading and in the system I am describing, they are combined under a general account entitled "construction general expense" and distributed over the cost of all contracts on the basis of the labor costs, and are allocated to sub-account "general."

This seems to be the fairest way to break up these few elements of cost having no factors upon which to distribute them to the contracts.

These elements, however, should be apparently small in comparison with the total cost of the work, and in the system I mention they are less than 2½ per cent of the total cost, and the total of sub-account "general" is less than 5 per cent of the total cost.

Care should also be taken by the contractor to see that those elements of expense which occur to a greater extent in one month than in another are distributed fairly over the whole year's work through opening reserve accounts for this purpose.

A reserve is maintained for what is termed the cost of errors in workmanship and design. By this is meant errors in workmanship and design by the contractor or the contractor's subcontractors. In the system I am describing, the reserve to carry this cost is based on one half of one per cent of the cost of production, and in establishing this system the contractor guarantees the customer against any loss or expense of this character.

Contractors necessarily must make a certain number of such errors and this plan seems to be the most satisfactory as the amount charged the customer is small and the protection is great.

The points that I have brought out in this system as being of advantage to cost plus work are equally as advantageous to flat price work, but as most of the business of our company is done on a cost plus basis, it is this class of work that has brought about the system just outlined.

There are many advantageous points in this system which I have not been able to describe in this article but which will develop where such a system is in use. But I want to say that for such a system to be a success it must be predicated on careful, accurate, and intelligent estimating on the part of the contractor, accurate allocating of costs by the contractor, and of his being ethical and honest in his charges.

Operating Reports and Their Usefulness to the Management

By E. H. Reed
Auditor Brooklyn City Railroad

EVERY public utility should adopt correct and sound accounting methods, for it must be understood that there are several parties interested in the correctness of utility accounting: First, the patrons or consumers, second the holders of both stocks and bonds, and, third, the state commissions, which have broad powers over construction, accounting, financing rates and service.

Out of commission form of regulation came the standardization of accounts, which has a very important advantage over the old method of accounting. It is essential that the accountant in charge should make a very careful study of the basic principles involved in the classification of accounts, so that a thorough knowledge may be imparted to those who are directly responsible for the distribution of the accounts.

Monthly income or operating reports give the investor reliable information as to the current affairs of the company, furnish the public and the commission with data necessary to judge fairly the company's public relations and give opportunity to the management to make comparisons of costs with similar utilities operating under like conditions, so that the relative efficiency of operation may be determined. It is usually the practice of utilities to make comparisons of the current month's income and expenses with the corresponding month of the previous year so that any increases or decreases in the accounts, for the period under review, may be shown. It should be the duty of the accounting department to make a thorough and complete analysis of these increases or decreases and a statement of the results found should be incorporated in the regular monthly report.

Another forward step could be made by a further division of accounts with very little extra expense to the utility and with no objections on the part of the state commissions. From inquiries made we find that very few companies, whether large or small, make any further subdivision than that shown in the classifications of accounts prescribed by state commissions. Under the head of "Repairs to Revenue Cars," we find that one company in New York City shows nineteen subaccounts, while another shows fourteen, with practically only two accounts that are comparable. In making a further comparison of accounts of the first company with those of a large Southern corporation, we find that the latter company has six more accounts than the one in New York with only twelve out of an average of twenty-two accounts that might be comparable. The same differences are found in comparisons of power, transportation, traffic, general expenses. In way and structures expenses we find a more comparative basis.

Under modern public utility statutes power has been given to commissions to prescribe systems of uniform accounting which furnish the facts necessary to determine the relative cost of service and the efficiency of operation. For obvious reasons the commissions go no further than the classification of accounts prescribed. With the management of a modern public utility, however, it can readily be seen that greater detail of expenses is required for the purpose of enabling those in charge of operations to more quickly locate any abnormal increase in any one unit of cost, the result of which might be the means of preventing moneys expended unnecessarily. It is information of this character, furnished promptly by the accounting department, that gives to the management a more distinct appreciation of the operating condition of a public utility. We recommend to the members of this association that consideration be given to a more uniform system in classifying these sub-accounts, to the end that regular monthly reports may be standard.

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*Abstract of a paper before the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 8-11, 1923.

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*Psychology of the Automobilist**

Tendency Toward Reckless Driving Should Be Overcome by Education and Restraint—Greater Care Should Be Exercised Also in Issuing Licenses

By L. F. Wynne
General Claim Agent Georgia Railway & Power Company, Atlanta, Ga.

LONG experience has taught us that the mental processes of the average citizen undergo a remarkable change the moment he purchases an automobile. He became a different person over night. Where he was once of a kindly disposition, considerate of the rights of his fellow men, and well content with the comfortable though comparatively leisurely mode of transportation afforded by the street cars, he suddenly becomes, when placed behind the wheel of his own motor car, a metamorphosed being obsessed with the sole idea of arriving at his destination in the shortest possible time, regardless of the rules of the road and the rights and desires of anybody else.

The lowly pedestrian, from whose ranks he has just been graduated, becomes in the motorist's eye an unspeakable being; a furtive, deceptive, dodging target whose peregrinations, if they are to be tolerated at all, should be confined strictly to the footpaths designed for them; and the street-car motorman, in this man's opinion, becomes a ruthless, scheming creature, an abysmal brute whose sole joy in life is derived from the pleasure he gets out of scattering the *disjecta membra* of motor cars over the surrounding landscape. This is the type of motorist, and he is shamefully numerous, who delights in just missing the wretched pedestrian as he scurries for safety, and who gets an unholy joy from "cutting off" a street car or another automobile in a tight place. Sometimes there is a moment's miscalculation and then the poor pedestrian, not as nimble on his feet, perhaps, as the driver anticipated—is removed piecemeal from the running gear. And quite frequently the street car, sailing serenely on its way, cannot be stopped quickly enough to allow this lord of creation to cut in ahead, and then there follows what is thechnically known as an automobile accident.

This tendency towards recklessness on the part of automobile drivers is, I suppose, but a manifestation of the trend of the times; an outgrowth of our vaunted hustle and speed. It would seem that we have for so long enjoyed and revelled in the reputation of being a nation of hustlers that the very fabric of our country's prosperity is builded on a callous disregard of all the amenities of life and that the theory of the survival of the fittest is the only principle by which our actions should be governed. Of course, this constant hustling and striving has been largely responsible for our country's rise to its present pre-eminence, but there are limits beyond which this utter disregard for the rights and conveniences of others should not be pushed. When this spirit of speed reaches the point where the lives of our citizens are constantly endangered it is time to call a halt and to cast about for ways and means of abating this constant menace to our communities' safety.

It cannot be denied that one of the greatest contributing causes of automobile accidents can be traced directly to the lack of even ordinarily intelligent methods of issuing licenses to prospective motor-car drivers. Every person is not fitted to drive an automobile any more than every person is fitted to take charge of a locomotive. A locomotive's course is confined to its path of steel rails and its operation is bound about and controlled by some of the most stringent laws on our statute books. The engineer attains his position only after years of apprenticeship and after passing the most rigid of tests. And yet virtually anyone is allowed, after the most perfunctory of examinations, to take charge of a powerful automobile, a machine as potentially destructive as a locomotive, and drive it where he likes through the crowded streets of our cities. That such a person might be unfitted to assume the responsibilities attaching to his duties is rarely discovered until after the accident. The motor car may fairly be said to be a deadly weapon of which we must take account only when it is in the wrong hands. It should be our business to see that it gets into the right hands and into no others, so far as that can be accomplished by measures of education and restraint.

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*Abstract of a prepared discussion on automobile accidents before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 8-11, 1923.

To insure this, a mental and physical examination should be made of every applicant for a motor-car license. Furthermore, the applicant should be required to present such a certificate of character as will afford at least an indication of his sense of responsibility to others. He should also be required to show that he is thoroughly familiar with the rules of the road and with the traffic regulations in the territory in which his car is to be operated. Finally, he should be made to show by a road trial that he has a satisfactory understanding of the operation of the car which he proposes to drive. The possession of an annual license, however, should entitle its holder to the issue of a new annual license provided only that his record of the twelvemonth past was clear of serious breaches of the law.

We claim agents, through our intimate association with accidents and claims, and our wide knowledge of the many ramifications of the problem, should begin to take an active and leading part in the promulgation of laws designed to enforce the safe and sane operation of motor cars. Public opinion at large has so far contented itself with expressing its indignation at the time of serious accidents and saying that something should be done. That is perhaps true also of us, though our remarks might have been more than ordinarily comprehensive and vociferous. But the time when we simply "stood aghast" or "viewed with alarm" is about over, I hope, for the time to act is close upon us.

First Educational Convention Conference Indorses Plans of Committee

President Budd Promises Backing of Association in Efforts to Inform and Train Employees—Delegates Approve Plan for a Course in Economics and Ask for Definite Information as to Getting Educational Work Under Way on Electric Railway Properties

At the invitation of Edward Dana, chairman of the committee on education, twenty-five or more railway men, manufacturers and educators met at the Marlborough-Blenheim for luncheon on Thursday, Oct. 11, to compare notes on employee training.

Mr. Dana first called on Britton I. Budd, newly elected president of the American Association, to open the discussion. Mr. Budd said that he had grown up in the electric railway business. Among all of his interests that in men stands out strongly. He had been impressed with the difficulty of explaining to railway men the economic side of the business. The fault here lies largely with the managements which have not furnished the information which the men desire. It is an educational lack.

Again, supervisors grow old and must be replaced. Educational work must be done to provide competent successors for these employees. Technical men also need to be obtained and fitted into the organization. The work should be attractive to them.

To illustrate the possibilities of educational work on an electric railway property Mr. Budd told of the successful lectures which had been given to large numbers of men on his property and the outgrowth of the educational work in the spread of the idea to other properties. Arrangements have been made by which courses on public utilities have been instituted by Northwestern University and the University of Illinois.

Mr. Dana said that there is no question as to the value of this work. How to carry it on for the benefit of the industry generally is the problem. He asked for critical suggestions of the work of the committee. M. McCants, San Francisco, said that the committee's suggestions are vague. They need to be more specific. Railway managers are too busy to apply the committee's outlines to their own specific cases. There is a chance for the association to do this. This idea was voiced by several other railway men.

Engineers' President Explains Comprehensive Program

H. A. Johnson, Chicago, president-elect of the Engineering Association, told of the educational work done by the Chicago Elevated Railways. This started gradually with the company's system of training understudies to take the places of all men in the organization. In encouraging the employees to improve themselves the company co-operates with the trade schools informally, and assists in financing tuition. The lectures on economics, etc., which were given recently held the interest of the men in a remarkable manner, showing the keen desire for information. The company each spring sends representatives to the technical schools to select promising technical men, who on entering its employ are given an all-round practical training. Their work is under the supervision of an executive of the company. The main problem is to find suitable jobs for these men so that they will be satisfied to remain with the railway. Under this plan only as many men should be taken on as can be conveniently accommodated in this way.

Mr. Dana asked a number of educators who were present by special invitation to give the point of view of the teacher in this matter. Prof. N. C Miller of Pennsylvania State College explained the operation of the extension courses conducted in connection with the industries by various methods. He said that the colleges are prepared to put business information into text form and to supervise the class work or correspondence instruction, but the industry must supply the fundamental facts. He asked for co-operation in connection with the plan outlined in an appendix to the 1923 report of the committee.

J. A. Moyer of the Massachusetts State Board of Vocational Training, said that the syllabus for an industrial course must be complete if instructors are to be able to conduct it in accordance with the desire of the promoters. With a general outline like that given in the report it is largely up to the man in charge of the course to fill in the details. This requires men thoroughly in touch with the industry involved, and each will give his own interpretation of the situation. Such instruction is difficult to supervise.

Mr. Dana then read the outline of the course as given in the report and the conference agreed that some such course should be given.

C. R. Dooley, who is in charge of vocational education for the Standard Oil Company, said that work such as that proposed by the committee will bring good results, but it should not go too fast. Instruction should preferably be given to small groups and under everyday working conditions. A study of the program of the Atlantic City convention showed a remarkable amount of attention given to what are virtually educational subjects, indicating the interest which the association is taking in this line of activity. Mr. Dooley was particularly impressed with the number of companies which had appointed educational representatives, which he considered a highly encouraging indication of practical interest.

The net result of the conference was a definite determination to urge the pushing of the educational work for which the committee's efforts of the past two years have prepared the way. There is no question as to the opportunity, but the difficulty is to furnish specific help to individual companies whose requirements differ through a wide range. The proposed course in electric railway economics should be generally useful.

Proceedings of the Claims Association

Code of Ethics for Railway Claim Agents Considered and Adopted. Active Discussions on Proper Organization of Claims Department and Other Topics

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Wallace Muir
Retiring President

W. H. Hyland
President-Elect

THE American Electric Railway Claims Association held four active sessions at Atlantic City last week, the interest in the discussions being as great or greater than at any other convention of the association. This interest partly centered about the question of the proper organization of a claims department, initiated at the 1922 convention but carried over to the 1923 meeting. Great interest was also caused by other very live topics on the program.

The first session was on Monday afternoon, Oct. 8, and the first order of business was the annual address of the president. An abstract follows:

President's Address

In his annual address, President Muir explained that the program for the 1923 session had been built about three ideas, namely: (1) the operation of a claim department at a minimum cost, consistent with efficiency; (2) reduction of accidents, and (3) the automobile hazard. He commended the reports and addresses on these subjects to the attention of the delegates.

In speaking about the report of the committee on automobile accidents and its recommendation for the permanent engagement of a safety engineer by the American Electric Railway Association, he gave full credit for the idea to the committee. He said that if the report met with the approval of the delegates he hoped the next administration would be able to convince the parent association of the value of the plan.

Speaking of the value of the exchange of ideas, Mr. Muir said, in part:

"No claims agent can succeed who lives within himself. He must work, study and accept the advice and counsel of others. He must benefit not only by his knowledge of the achievements of others in the same line of work, but also by their mistakes, and this can be accomplished in only one way, and that is by a large number coming together once a year and discussing the important questions confronting them.

"Those of us who have attended these conventions from time to time know the advantages received, and we should not lose the opportunity at all times to convince other claims men, as well as executives, of the importance and benefits of these meetings. I feel sure that none of us has ever attended any of these conventions that he did not return to his work better fitted for the task and with a feeling that he had been fully repaid for the time and expense given in attending the convention."

Mr. Muir discussed the qualifications of a claims agent and outlined them in the following words:

"No one connected with the railway industry has a greater responsibility than the head of the claims department. No one has more complex and important questions to determine than he. The claims agent must be a man not only of ability and excellent reasoning power, but he must be alert to his duties and responsibilities. He must be scrupulously honest and one whose integrity cannot be questioned. He must be willing to sacrifice his personal affairs and pleasures for the benefit of his company, and above all, he must so conduct himself as to command the respect of the community in which he lives and works.

"Notwithstanding these qualifications and with all that is intrusted to him by his company, executives often times injure his work and curtail his influence in the community by their attitude toward him and his department. He must have the confidence of his superiors, and the superior must recognize his capacity and give him such a standing in his company as will show to the community the esteem in which he is held by the company. He cannot expect to succeed if he is to be but a middle man between the company and the public. He must be a part of the company."

Report of Secretary

On motion the recommendations of the president were referred to the incoming president and executive committee for consideration and action.

The reports of the executive committee and the secretary then followed. The latter gave a list of the questionnaires sent out and showed thirty-two individual members in the association. This is of course in addition to the number who belong because of company affiliation. S. B. Hare, William Tichenor, and John J. Reynolds were appointed members of the nominating committee.

Code of Ethics

Russell A. Sears, general claims attorney Boston Elevated Railway presented a paper on "A Code of Ethics," published in abstract elsewhere in this issue. At the conclusion of his address, President Muir expressed the indebtedness of the association to Mr. Sears for the paper and said that if the principles as laid down by him in the paper were carried out by the claim agents there would be a much better understanding in the community. He then explained that at the request of Mr. Sears, this paper had been referred to a committee, of which W. H. Hyland of the Fonda, Johnstown & Gloversville Railroad was chairman.

Mr. Hyland urged the adoption of a code of ethics, and while he was in great accord with most of the code as suggested, he had some changes in wording to suggest. These included, in section 4, the omission of the phrase, "The representative of the company is not bound, unless requested, to disclose his identity," and in section 7, "future uncomfortable or unexplainable situations are thereby avoided."

Mr. Jack of Wilmington, in referring to section 8, asked how it was possible to know whether the injured person's representative had illegally or improperly procured authority. Mr. Sears explained that that clause mentioned was founded on a ruling of the bar association, which has always declared that if a case has been illegally or improperly solicited by the person representing it, it was not unprofessional to go behind his back and transact business with the injured person, just as though there had been no attorney. On vote further discussion on the code was carried over until the following session.

The report of the committee to investigate and report on the proper or-

TABLE GIVING ANALYSIS OF THE WORK AND COST OF SETTLING ACCIDENT CLAIMS, SUBMITTED BY COMMITTEE TO INVESTIGATE AND REPORT ON THE PROPER ORGANIZATION OF THE CLAIMS DEPARTMENT

	Question	Group A (Companies with more than 5,000 accidents a year)		Group B (Companies with from 1,000 to 5,000 accidents a year)		Group C (Companies with from 500 to 1,000 accidents a year)		Group D (Companies with 500 accidents or fewer during year)	
		No. of Cos. Reporting	Amounts or Percentages	No. of Cos. Reporting	Amounts or Percentages	No. of Cos. Reporting	Amounts or Percentages	No. of Cos. Reporting	Amounts or Percentages
1	Number of accidents in 1922	15	171,620	32	69,508	14	11,744	39	6,931
2	Number of accidents of companies reporting the number of accidents investigated	10	109,107	25	51,640	13	10,933	37	6,155
2a	Number of accidents investigated by companies replying to question 2	10	48,360	25	28,420	13	6,307	37	3,892
2b	Percentage of accidents investigated to total	10	45%	25	55%	13	57%	37	63%
3	Number of accidents of companies reporting on number of claims made	14	165,560	29	63,338	11	9,431	38	6,532
3a	Number of claims made (all descriptions)	14	50,203	29	17,405	11	2,965	38	2,059
3b	Percentage of claims made to accidents reported	14	30%	29	27%	11	30%	38	31%
4	Percentage of companies reporting an increase in claims	10	....	12	....	8	....	12	....
4a	Percentage of companies reporting a decrease in claims	3	....	13	....	6	....	25	....
5	Percentage of settlements made for personal injury and property damage	13	30,484	29	12,237	11	1,467	39	1,153
5a	Percentage of claims filed against companies answering question 5	13	47,203	29	17,405	11	2,965	39	2,148
5b	Percentage of settlements to claims made	13	65%	29	70%	11	49%	39	56%
6	Employees in claim department or in its behalf[a]	14	491	27	284	13	80	29	106
6a	Total number of accidents of companies replying to question 6	14	163,967	27	57,616	13	10,933	29	5,709
6b	Average number of accidents of companies replying to question 6	14	11,711	27	2,133	13	841	29	196
6c	Average number of employees per company	14	37	27	7	13	6	29	4
7	Number of companies reporting increase on number of suits filed and disposed of during calendar year	6	....	12	....	6	....	13	....
7a	Number of companies reporting decrease in same	7	....	13	....	4	....	1	....
8	Total expenditure of claims department during year[b]	15	$5,998,658	30	$2,581,016	13	$483,870	27	$261,673
9	Cost of maintaining claims department	15	$1,436,723	30	$645,315	13	$104,096	27	$71,874
9a	Percentage of amount in question 9 to that in question 8	15	25%	30	15%	13	21%	27	27%
10	Average percentage of amount given in question 8 to gross	15	3.25	30	3.01%	13	2.5%	27	1.77%
10a	Average total expenditures per company	15	$400,000	30	$86,000	13	$37,220	27	$9,700

Notes—[a] Including doctors, lawyers and all persons whose salary, expense or any part thereof is charged to injuries and damages. [b] Including expense of claim organization.

ganization of the claims department with written discussions by Messrs. Drown and Robinson follows:

Claims Department Organization

The report of the committee to investigate and report on the proper organization of the claims department took the form this year of statistics which have been compiled in tabular form and are presented herewith. The committee reports that about 100 companies replied and points out that the statistics from them have been arranged in four groups, depending on the number of accidents reported per company. The following summary is also given:

Average percentage of accidents investigated to accidents reported	55
Average percentage of claims made to accidents reported	30
Average percentage of settlements to claims made	62
Average claims per company	789
Average employee per company	10
Average settlements per company	494
Average number of claims per employee	78
Average number of settlements per employee	49
Investigation shows litigation increasing in a majority of sixty-two reporting companies	62
Average percentage of claims department expense to total expenditures (approximate)	25

The report is signed by Neil W. Funk, J. S. Kubu and Walter E. Robinson, chairman.

COMMENTS BY MR. ROBINSON

Walter E. Robinson, claim agent Cincinnati Traction Company, the chairman of the committee on the proper organization of the claims department, also presented a paper on this topic. Briefly, it was a defense of the position taken by him at the 1921 convention in which he argued against "over-organization" in the claims department.

Commenting on the statistics obtained by his committee, he said it was a matter of surprise to learn that such a proportion of the reported accidents require investigation, and he felt the importance of this part of the duty of the claim agent has been exaggerated without reason and has resulted in unnecessarily over-manning many departments. In fact, he thought that an investigation in many instances is detrimental because the too enthusiastic investigator paves the way for endless trouble.

The speaker declared that the value of organization is manifested nowhere more than in the rate of percentage of expenditures to the gross revenue and that in the natural order of things the rate should decrease with increased earnings. Nevertheless, the report showed that the companies maintaining the highest earnings are likewise maintaining the highest percentage of damage expenses to the gross revenue, indicating, in the speaker's opinion, an expenditure in excess of what it should be. He thought the practice of settling claims outside the office to be the most glaring disorder of the claims department. This leads to the settlement of many claims wholly without merit or substance and can be accounted for only by the undue anxiety of the traveling adjuster. In the speaker's opinion, this method was "the surest means of incurring the displeasure of those who are seriously injured and of the greatest assistance to those who are not so sure of their injuries."

COMMENTS BY MR. DROWN

In a written discussion H. V. Drown, general claims agent Public Service Railway, Newark, took issue with Mr. Robinson. He remembered that Mr. Robinson had declared at the 1921 convention that by the simple expedient of sitting tight in his office and compelling all claimants to come to see him he was able to keep the claim disbursements down to a fraction less than 2 per cent, and Mr. Robinson appeared to believe that any higher rate of expenditure could be explained only through over-organization in the claims department. Mr. Drown's position was that local conditions have a great deal to do with the percentage rate and that the low rate in Cincinnati is not due to the policy of having claimants come to the office of the claims agent. To prove this he quoted the figures from several companies in cities not far from Cincinnati which have as low or nearly as low a rate as Cincinnati, although the method followed by them is to go out and settle claims. As examples, the speaker mentioned Columbus, Dayton and Indianapolis. Farther to the north the percentages are higher, but it will be found also that the ratio of foreign born to the total population is higher. This ratio in Cincinnati is 10.70 per cent, whereas in Cleveland it is 30.14 per cent and in Newark, N. J., 28.36 per cent.

Another local condition affecting the percentage rate is the character of right-of-way. Thus, subways and elevated railways and railways operating over private right-of-way should have low percentage. The condition of track and equipment and the width of the street or highway has also much to do with results. Thus, Washington, D. C., with its broad avenues, should have a lower percentage than Providence, R. I., with its narrow lane-like streets, other things being equal. The attitude of the public press also affects the figure, not only in the treatment of the company as a whole, but in its inclination or disinclination to feature accident news. In some cities the account of an accident is often accompanied by lists and addresses of the injured and writeups of court results, with the names of the plaintiffs' attorneys, thereby giving them valuable free advertising. Politics also plays a part.

Another factor is the law as regards negligence. Thus, in New Jersey the court has held: "It is not negligent *per se* or negligent in law for a person driving a vehicle in approaching a street crossing over which he intends to cross to fail to look for an approaching street car in order to avoid danger from it. The question of whether he was negligent or not must be submitted to the jury for them to determine as a question of fact." It has also been the tendency in decisions in New Jersey to hold that a pedestrian starting to cross the street and seeing a trolley car a sufficient distance away to justify him in assuming that he has the right of way need not look again toward the approaching trolley car, but can assume that the motorman will respect his right of way. In Pennsylvania the law is much more strict as against the driver of the highway vehicle as well as against the pedestrian. A somewhat corresponding difference between the laws of New Jersey and New York occurs in the extent to which the negligence of a parent can be chargeable to a child when parent and child go hand in hand into danger, if the child is too young to be chargeable with contributory negligence. The rate of compensation considered proper by the court to allow in death and personal injury cases also greatly affects the percentage. The speaker said that for some years he had been connected with the claim department in Cincinnati, and during that time he was greatly impressed with the fact that the general run of claimants was exceedingly fair to deal with. Most of them were either of German birth or descent, and the Teutons are known to be non-litigious and not ready to exaggerate or mis-state facts in the presentation of damage claims.

As a further example of the effect of local conditions, the speaker referred to Montreal, where the percentage of gross for the "injury and damage liability" was a bare 0.974 per cent of gross receipts. This the speaker attributed largely to the basic law which is modeled on the French code Napoleon. He believed that at the present time when a pedestrian is injured in collision with a vehicle in Paris he is subject to arrest for being presumptively an offender against the laws relating to traffic. In New Jersey, on the other hand, the courts have not only held that pedestrians have as much right on the highway as vehicles, but have held also that public streets in a populous city are playgrounds for children and that users of the highway must anticipate that the streets are subject to such uses. Such circumstances necessarily increase the damages.

Discussion

J. H. Handlon, Market Street Railway, San Francisco, said that when he first went to that city the company was paying out a large amount of money in settlement. He decided to follow the policy of Mr. Robinson and was able to dispose of 99 per cent of the claims. He believed that in some cities one plan would work better; in other cities the other plan was preferable.

In answer to a question, Mr. Robinson said that his organization in Cincinnati included four persons besides himself, and a stenographer. All are inside men. There are no outside men. He doubted whether his plan would work on a distinctly interurban property, as people cannot be asked to come a long distance. In Cincinnati, however, they can ride to his office for 8 cents. In answer to still another question, Mr. Robinson said that the largest verdict ever paid by his company while he had been connected with the claim department was $10,000.

Joseph F. Kubu, assistant superintendent accident department, Cleveland Railway, said that in the claim department of that company there were sixty-five employees including twenty-three investigators. The company does not investigate every case, and an average of about fifty claimants call at the office every day, but he believes that there are cases where it is necessary to go outside the office to see the claimant. He thought it was a great help for a representative of the company to say to the claimant: "You may call at our office when you get better. If the company is responsible, we shall take care of you. If it is not responsible, we will not be able to do anything for you." Ambulance chasers force the company to take this course.

John W. Yensen, Third Avenue Railroad, New York, said that that company had been impressed with the remarks of Mr. Robinson at the Chicago convention, and during the last year it had been applying his policy with some of the minor claims. He thought that a year from now he would be able to tell better the practical results. He was inclined to agree with a number of other speakers that much depends on conditions, and he did not believe that Mr. Robinson had to contend with a large foreign population, such as exist in many cities.

William Tichenor, claims agent Terre Haute, Indianapolis & Eastern Traction Company, said that he settled many of the claims against his company in his office, but was not able to settle all of them. He thought the proper plan was to come as near the policy of Mr. Robinson as possible.

I. S. Fairty, legal and claims department Toronto Transportation Commission, said that in a case of collision, three things were necessary. One was to be sure the person supposed to have been injured was on the car; second, to find out the extent of his injury, and, third, to show him that the company has sympathy in the case. Accidents are investigated in Toronto by a representative of the department, but only in rare cases are claims settled out of the office. He has sixteen employees in his department, including stenographers. He explained that in the Province of Quebec, the civil law rule of common fault, whereby both parties are guilty, applies, and this explains to some extent the low figures for Montreal which had been mentioned in one of the reports. The Canadian Bar Association has passed a resolution that this law should be adopted throughout Canada, though he doubted whether the law was more favorable to the defendant than the common law rule.

W. H. Renaud, Jr., claims agent New Orleans Public Service, said that the figures of that company for the past fifteen years average about 2½ per cent of its gross, and this year during the first eight months the percentage was 2.14. He has a total of fourteen employees, including office men and outside men, and believed in following up accidents. The company has had several large claims, as, last year one of $28,000, another of $11,000, and another of $14,000; yet the percentage was kept down to 2.14. In Louisiana nine members of the jury can agree and bring in a verdict, even if the other three differ, but the Appellate Court has power to review both the law and the facts in a case.

It was decided not to continue the committee, and the meeting adjourned at 6.30 p.m.

Tuesday's Session A. E. R. C. A.

THE first order of business at the meeting of the Claims Association on Tuesday afternoon, Oct. 9, was action on the code of ethics as submitted by Mr. Sears, with the amendments proposed by the committee, of which Mr. Hyland was chairman, as given in the report of Monday's session. Mr. Sears said that he had no objection to the amendments offered by the committee and moved that they be adopted. Mr. Hyland then moved the adoption of the code which was unanimously accepted. The association then through a rising vote extended to Mr. Sears a vote of thanks for his splendid work in the preparation of the code.

The paper as printed elsewhere in this issue includes the amendments.

G. T. Hellmuth, Chicago, presented the report of the committee on automobile accidents. In doing so, he referred to the meeting in Buffalo of the electric railway section of the National Safety Council, at which he was present and suggested that great benefit would follow a close connection between the electric railway section and the

Claims Association. An abstract of the report of the committee on automobile accidents follows:

Automobile Accidents

The report of the committee on automobile accidents consisted largely of the recommendation that a safety engineer be permanently engaged by the American Electric Railway Association "to vitalize and make enduring all association safety work." In its opinion this was the most important thing to do to reduce accidents arising through the operation of motor vehicles. In support of its position the committee reviewed recommendations made at previous conventions of the association, some of which had not been carried out largely because the Claims Association had no permanent staff man. In conclusion the committee says:

"Your committee feels that no business so conducted that its officers and management change each year could hope to achieve the utmost success and it believes further that we need a paid executive secretary or a paid safety engineer, call him which you please, to knit together our activities and to build up and make continuous the work of the association. This man will have to be very carefully selected by the incoming president and possibly by a committee appointed by him, and his salary should be adequate to insure getting a man with experience and ability."

The report was signed by D. M. Finch, J. G. Bruce, Carl Young and G. T. Hellmuth, chairman.

Ralph W. Emerson, general manager Cleveland Railway, presented a prepared discussion to this committee report. An abstract will be found on another page of this issue. It describes among other things the method followed by the authorities of Cleveland to curb reckless driving and the resulting reduction of automobile accidents.

L. F. Wynne, general claims agent Georgia Railway & Power Company, Atlanta, presented a written discussion on the report of the committee. An abstract appears elsewhere in this issue.

In calling for discussion from the floor, President Muir said it was generally admitted that the most important question confronting claim agents at present is the automobile hazard, and he hoped that the discussion would bring out helpful remarks. He also pointed out that the suggestion for the employment by the association of a safety engineer had been made and remarks on the plan were pertinent to this topic.

I. S. Fairty, Toronto, in referring to Mr. Emerson's paper, asked whether any other states besides Ohio had a law giving street cars the right of way over automobiles. He said he was under the impression that there was such a law in Alberta.

In reply C. B. Proctor, claims agent Memphis Street Railway, said that in Arkansas the law gave the street car the right of way both at intersections and elsewhere, and Mr. Hyland, Gloversville, said that under the New York State law cars have paramount right of way between blocks, but at intersections the rights between the vehicle and the street car are equal.

Address by President Emmons

At this point President Muir said that C. D. Emmons, president of the American Electric Railway Association, would speak to the delegates.

Mr. Emmons said that he had simply slipped into the back of the room to see each section in action, but it was a great pleasure for him to address the delegates. He thought the success of the entire convention depended upon the affiliated associations and the way in which they had taken hold of their individual problems. No matter what kind of transportation the street railways used, the claims department would be necessary, and the faster the transportation, the more the claims department would have to do. He also complimented the claims representatives on the wonderful work which they had done in safety work and consequently in reducing accidents and accident claims.

J. W. Welsh, executive secretary, who was introduced, explained that the whole headquarters organization was at the service of the delegates and asked the delegates to send in at any time suggestions as to how the work could be improved.

Continuation of Discussion on Automobile Accidents

In answer to a question, J. S. Kubu, Cleveland, said that before new men are put to work on the cars in that city they have a lecture on accident prevention, and such lectures are given at intervals to all inspectors, motormen and conductors. The work is done through the accident prevention department of the company. J. J. Sharkey, claims agent, New York State Railways, Rochester lines, said the same practice was followed in that city.

L. S. Wynne, Atlanta, gave statistics showing that the safety work of his company had been followed by a reduction of accidents.

H. K. Bennett, safety manager United Electric Railways Company, Providence, said that 404 accidents out of 659 in a recent period in Providence were connected with automobiles and that the cost in 1922 for automobile accidents was more than 40 per cent of the entire accident cost. In Massachusetts a law has been seriously considered requiring automobiles to stop before passing over railroad crossings and to be obliged to maintain such a speed when coming out of intersecting streets on the main thoroughfares that they can be brought to a stop before coming into the highway. If such a law should prevail all over the country, it would reduce automobile accidents to a minimum. Of the 404 accidents mentioned, ninety were from right intersecting streets and eighty from the left intersecting streets; a large number were "sidewipes" where automobiles attempted to pass other traffic; seventeen were where automobiles ran headlong into the cars; thirty were where automobiles ran into the cars which had stopped to take on passengers, etc.

S. B. Hare, claims agent Altoona & Logan Valley Electric Railway, then read the following report of a recent New York court decision:

Report of Court Decision

The burden of responsibility for motor accidents at railroad grade crossings is placed squarely upon the motorists in a decision handed down by the Appellate Division, third department, at Albany, N. Y., the text of which has just been published and is attracting widespread attention among lawyers. The decision upsets a jury verdict in which the administrators of the estate of a victim of a grade crossing accident were awarded damages. It relieves the New York Central Railroad, whose train killed the motorist James W. Horton in Albany County, of all responsibility.

The fact that the so-called disk sign existed at the approach to the grade crossing, and 300 ft. distant from the tracks, was sufficient to establish contributory negligence on the part of the motorist who was killed. The Appellate Division for the first time interprets the disk sign act, passed by the Legislature in 1919, and the court places such a construction upon the act as to make elimination of grade crossings only a matter of convenience for motor traffic, not a matter of obligation on the part of the railroads in the interest of safety of motorists.

Incidentally, the court lays down rules of conduct for motorists approaching grade crossings, and those rules form an interesting code. Among them are these:

> 1. The safe limit to speed in approaching a crossing is that speed at which the driver of an automobile, as he arrives at a point where he can see an oncoming train, when it is near enough to render crossing ahead of it dangerous, can stop his car if necessary before he reached the track.
>
> 2. If he can not see without stopping, he must stop. If he sees a train threatening danger to him, of course he must stop. If he cannot see whether or not he is so threatened, likewise he must stop.
>
> 3. It was the intention of the Legislature by this act that no driver of an automobile should come within the limit of the narrow strip occupied by a passing train at a time when he could collide with it.

HARD TO RECOVER DAMAGES

The effect of the decision is to make it extremely difficulty for any motorist who is struck by a train to recover damages from the railroad. The court recognizes this and says:

> It is said, if so strict a rule is laid down by this statute and upheld by the courts, that seldom if ever could recovery be had for injuries received at a crossing. It is out of view that if the drivers of automobiles obey this statute in its letter and its intent, seldom if ever will injuries be suffered at a grade crossing. The price of safety by obedience to this statute means no more than three or four seconds of time —a small price for a life. And in any event we believe the Legislature was more interested in preserving life and limb than in preserving the right to recover damages for life and limb lost.

The disk sign act, Chapter 438 of the Laws of 1919, provides that the municipality or other authority charged with the duty of maintaining a highway at a grade crossing shall install and maintain an approach warning sign on the highway each side of the grade crossing at least 300 ft. from the track.

The Disk Sign

> The approach warning sign shall consist of a metal disk 24 in. in diameter with a white field and a black border line 1 in. wide and with black perpendicular and horizontal cross lines 2½ in. wide, the reverse side of each disk colored black. In each of the upper quarterings shall appear in black the letter R, 5 in. high, 3¾ in. wide, lines 1 in. stroke.

The act further provides that the railroad company shall furnish the authorities with these disk signs for erection 300 ft. from the grade crossings, and if physical conditions make it impractical to place the signs 300 ft. from crossings, other suitable locations or signs may be furnished. Then the statute says:

> It shall be the duty of the driver of any vehicle using such street or highway and crossing to reduce speed to a safe limit upon passing such sign and to proceed cautiously and carefully with the vehicle under complete control.

The court remarks in discussing the statute that the advent of the motor car brought a new law and new rules, and continues:

> The motor car is quite distinct from the horse-drawn wagon. It both introduces new dangers and removes some of the old dangers. It tempts high speed; it inspires impatience and encourages the driver to take chances to beat the train. Because of its weight, its momentum, its inertia, its strong metal construction and its speed, it wrecks trains. On the other hand, when properly driven and maintained in good condition, it is under complete control; it may be stopped or started at will; it will stand without hitching and may be safely left unattended; it will not take fright at a train, however close to its nose. Our old rules must be adjusted to the new condition, or new rules must be made to cover the new needs. Considerations similar to those we conceive induced the Legislature to enact the statute of 1918. The act was intended to accomplish something toward increased safety by establishing new rules of conduct.

Sufficient Warning

> It has been the custom to place warning signs immediately at the crossing. One not familiar with the crossing or inattentive might not realize as he aproached a crossing, its existence until he reached it. Now he is informed of it when 300 ft. away, at which point he receives timely warning; he must therefore reduce his speed to a safe limit. The safe limit is a limit at which, with his attention no longer distracted while controlling and directing his speeding car, he may discern the approaching train and stop his car before he is in the danger zone, namely, the track, which, with the overhang of the cars, means a width of only nine feet.

As to the case in hand, it is held that the motorist was familiar with the locality, and could have seen the train when he was 18 ft. from the track. If he had been proceeding carefully and cautiously, as required by law—if he had obeyed the statute he would not have been struck. The railroad gates were open, and there was no flagman at the crossing at the time, but this did not excuse the motorist. The disk signs had been erected and were sufficient warning. The estate of the victim could, therefore, recover nothing.

The decision, lawyers believe, introduces a new principle of law so far as the question of contributory negligence is concerned in grade crossings accidents. Under the old practice, the fact that the driver did not stop at a crossing was not in itself contributory negligence. It was a matter for a jury to decide. Now it would appear that if a driver doesn't stop, after passing the disk sign, he is guilty of contributory negligence, as a matter of law.

Discussion Continued

Russell A. Sears, Boston, told of a conference of the street railways in Southern New England two or three years ago to consider what could be done to reduce the cost and number of automobile accidents. It was found that these accidents were costing the public $2,000,000 a year, to say nothing of loss of life and limb. The interest of the Department of Automobile Licenses was secured, and the speaker expected that a bill would be introduced into the Massachusetts Legislature this fall giving the Register the right to revoke the license of any motor driver who collided with a street car at an intersecting street.

W. H. Renaud, Jr., New Orleans, believed that such a law would be very desirable if generally applied.

Cecil G. Rice, superintendent claims department, Pittsburgh Railways, said the idea of safety should be sold with every automobile. Many people are deterred from buying automobiles because of the danger of operation, and the manufacturers for business reasons should co-operate in any plan which will decrease automobile accidents. Thus the manufacturers should encourage the plan by which no one could procure an automobile license without an examination and test, and they should encourage the strict application of the traffic laws. Pittsburgh has a traffic court, similar to that at Cleveland, and it has proved of great value. Recently drivers convicted of intoxication or recklessness have been receiving jail sentences.

H. D. Briggs, assistant general claims agent Public Service Railway, Newark, thought the biggest hope for the reduction of accidents caused by automobiles was in legislation, and he urged that a committee be appointed to report at the 1924 convention on legislation of the various states on this subject, with a view to making it as complete and full as possible, as well as uniform in the various states.

William G. Fitzpatrick, general claims attorney Detroit United Railway, pointed out that legislation should give railways the right of way at all highway intersections and should include all occupants of the automobile in statutory negligence of the operator of the automobile. He thought these two things would do more to reduce the automobile hazard than anything else.

William Tichenor, Indianapolis, declared that while the legislation proposed would be helpful, the companies should not relax every effort possible through themselves. He cited the case of a car on a railroad right of way, which after whistling had struck an automobile, but of twenty-five persons who might have heard the whistle, only four did so. If the whistling had been so loud that all of the twenty-five witnesses could have heard it the occupant of the automobile might also have done so and the collision might not have occurred. He thought that some benefit would come if automobile operation, even if in a small way, could be put under the control of the state public service commissions, for instance, in connection with the location of warning signs.

By request of a member, Mr. Hellmuth then outlined his ideas of the duties of the safety engineer proposed for employment by the American Association. Among other things such an engineer would collect claims data of interest to the association, circularize the members, and exchange their views of the legislation wanted, making it possible to advocate some specific law. His instructions would come from the executive committee, and he could suggest to the committee work he thought he could profitably perform.

Russell A. Sears, Boston, suggested that it would be more effective in public discussions on the automobile to emphasize the benefit of a clear roadway to the passengers on the car rather than demand a "right of way" for the company. He also pointed out that the registrar of automobile vehicles in Massachusetts had declared that the plan of educating motorists to greater care was all right, but it was a slow process. Immediate action is what is needed, and the one thing the driver of an automobile fears is to lose his license. This penalty has had effective results in Massachusetts.

On motion it was then decided that the incoming president of the Claims Association should bring to the attention of the executive committee of the American Association the desirability of the employment of a safety engineer.

E. L. Lindemuth, claims agent Wilkes-Barre Railway, presented the report of the committee on the Hooper-Holmes Bureau. An abstract follows:

Hooper-Holmes Bureau

The Hooper-Holmes Bureau, as is known to most of our members, operates for the insurance, railroad and street railway companies a clearing house through which information is exchanged relative to personal injury claimants. This work was inaugurated in 1899 for the accident insurance companies and a few years later was extended to the railroad companies, and, through a special subscription arrangement made with the American Electric Railway Association, to the individual member companies of the organization. Its purpose is to furnish information regarding personal injury claimants by whom prior or concurrent claims have been made against other companies. Such information in many cases is extremely valuable, the reports thus rendered affording substantial protection against fraudulent and excessive claims.

The method of handling the reports is as follows: Each subscriber or participating company is supplied by the bureau with blanks on which to report its claimants. On receipt of every such report the bureau records are carefully examined to determine whether the party has previously been reported by any other company either for the same or a previous injury. If not, a record of the claim is simply filed away in its alphabetical place for future reference, but if the records show one or more other reports on the party, each of the companies which reported it is at once notified and can thus immediately communicate with one another and exchange information concerning such claimant.

At the present time the bureau files contain over 8,000,000 records covering the entire United States. These are now increasing at approximately 600,000 a year.

In the handling of a personal injury claim there is probably nothing more important, aside from determining the question of liability, than a knowledge of any previous claim record which the party may have. Quite often it is difficult, if not impossible, to secure this through investigation, and in some instances the information obtained is not received in time to be made practical use of in connection with the settlement. Such a service, therefore, as is rendered by the bureau constitutes a valuable adjunct to the work of the claim department, and the reports not infrequently are of such a character as to show that the claim is wholly without merit or to furnish information which is of material value in the event of litigation.

The following is a comparative statement of reports made to the Hooper-Holmes Bureau by member companies for the years ended May 15, 1923; May 15, 1922, and May 15, 1921, in which you will note there were eleven member companies reporting to the bureau in 1923, fifteen in 1922 and nineteen in 1921.

Company	Number of Reports 5-16-22 to 5-15-23	 5-16-21 to 5-15-22	 5-16-20 to 5-15-21
Cleveland Ry. Co.....	1,421	1,545	2,515
Detroit United Ry....	.....	.....	1
Duluth Street Ry.....	100	82	255
Fonda, Johnstown & Gloversville R. R...	1	3	1
Georgia Ry. & Power Co...............	5	93	260
Hudson & Manhattan R. R.............	3,366	564	238
Illinois Trac. System..	2	2	.....
Market St. Ry........	410	345	397
New York State Rwys., Rochester...	2	13	27
New York State Rwys., Syracuse....	51	213	108
New York State Rwys., Utica.......	185	200	168
Northern Ohio Trac. & Lt. Co...........	1	.....	5
Pittsburgh Ry........	327	87	83
Puget Sd. Elec. Ry.....	.....	.....	5
San Francisco-Oakland Term'l. Rwys..	.....	.....	17
Tacoma Ry. & Power Co...............	21	25	23
United Rwys. & Elec. Co. of Baltimore....	2,251	2,423	3,704
United Rwys. of St. Louis............	1,148	496	539
United Trac. Co. of Indiana...........	105	75	110
Wisconsin Public Service Co.........	.....	.....	1

In addition to the companies above listed the following named association members for several years past have been actively participating in the bureau work as individual subscribers and I understand that during the three-year period mentioned reports have been rendered by them annually approximately as follows: Boston Elevated Railway, 960; New York Railways, 340; Philadelphia Rapid Transit Company, 2,400; Public Service Railway of Newark, N. J., 2,600.

The work of this bureau for the member companies of our association has been discussed on some occasions at considerable length at various conventions of the association, at some of which a representative of the bureau was present and addressed the members on the value of the service to the member companies. One of our members has written me at length on the subject, saying he had never been able to understand why the members of our association have not participated more generally and to a greater extent in the work of the bureau. If the street railway companies generally more freely reported their claims, the reports received by them from the bureau would save them annually many thousands of dollars.

The report was signed by E. L. Lindemuth, convention secretary.

After the motion had been carried to refer this report to the incoming executive committee of the Claims Association, the meeting adjourned at 6:30.

Wednesday's Session A. E. R. C. A.

ON WEDNESDAY the claims association held a session by itself and also a joint session with the Transportation & Traffic Association. The latter was reported as such in the issue of this paper for Oct. 13. The separate meeting of the Claims Association convened at 1:45 with President Muir in the chair. E. F. Livingstone, chief investigator of litigated claims Boston Elevated Railway, presented a paper on "The Preparation of Litigated Claims." It will be found in abstract in another column.

J. Frank O'Hare, trustee of the Boston Elevated Railway, said the time had come when street cars should have right of way on streets over automobiles because of the larger number of people carried per vehicle. The rights of passengers should be paramount to the rights of the individual, especially in the rush hours in the morning and evening. He also urged more strict sentences for violation of traffic laws by automobile drivers.

At the request of the president, a discussion of the subject of organization of the claims department, as considered on Monday, was taken up by S. B. Hare and Cecil G. Rice. Mr. Rice presented the report.

Special Committee on Organization of Claims Department

Since its inception the street railway industry has been marked by discussion of methods and practices of operation, engineering, accounting and claims. There have been exhaustive researches, broad surveys, detailed comparisons and complete data compilations. In all branches selection has been made of those things found to produce the most satisfactory results when applied to the particular property making the study.

Because claims are influenced and affected by the multitudinous matters noted by the human mind, universal practices are not and cannot be adopted. Surviving through all these years is the elemental question of whether to await the presentation of a claim or to hasten conclusion of the potential liability by personal call and the extent to which inspection should be made.

During the past three years and at this convention in particular, the matter has been debated to tireless completeness. Both methods find supporters. Results reported vary. In this detail as in most matters affecting the industry action according to the circumstances is indicated, varying with the locality, the occurrence, the individuals involved and the ramifications of community life.

Comparison of results collect too many variables to warrant conclusions of cause and effect from incidental routine. Therefore this convention records adherence to the objects of the association:

> To endeavor through co-operation, study and discussion to ascertain, inaugurate, maintain and develop those modes of procedure, practices, policies and ethics most effective in preventing accidents, determining and discouraging unreasonable claims, minimizing inequitable expenditures and other waste, defending against unfair demands, equitably adjusting claims owed, and otherwise advancing the ultimate best interests of member companies and those they serve.

Recognition is given to the right of any necessity for each member to determine by judgment and experience what is "most effective" according to the circumstances surrounding the interests he serves in the light of all information presented to the convention for his consideration.

A most important fundamental truth is that to prevent an accident is to eliminate a claim.

The report was signed by Cecil G. Rice and S. B. Hare, special committee.

Question Box

The questions in the question box were read by E. L. Lindemuth, Wilkes-Barre. There was time only for the discussion of one. This was "Is it worth while to try to collect damages from automobile owners who break our cars in collision, where we are free from blame?"

W. H. Renaud, Jr., New Orleans, said it was the custom in that city to collect such damages, as it had been found to help reduce automobile accidents. It brings the matter home to the owner of a car and in the case of a commercial truck, the owner often would not hear of the accident, except in this way. Many of the truck owners carry accident insurance, and the collection stimulates the insurance companies to stop accidents.

Cecil G. Rice said he followed the plan in Pittsburgh in only a few carefully selected cases.

On the Detroit United Railway, according to Mr. Fitzpatrick the work is done entirely by one individual, and the recovery pays his salary four times over during this period. The greatest good has come in a preventive way.

In San Francisco, according to Mr. Handlon, the claim is always presented where the driver has damaged a standing car or where the driver of the automobile, according to records, was intoxicated or violated a traffic rule, but where it is thought the company is partly responsible, the benefit of the doubt is given to the automobile.

New Officers

The report of the nominating committee was in the favor of the following as officers for the ensuing year:

President, W. H. Hyland, claims agent Fonda, Johnstown & Gloversville Railroad, Gloversville, N. J.

First vice-president, H. D. Briggs, assistant general claims agent Public Service Railway, Newark, N. J.

Second vice-president, J. H. Handlon, claims agent Marget Street Railway, San Francisco, Cal.

Third vice-president, C. B. Proctor, claims agent Memphis Railway and Memphis Power Company.

The executive committee consists of the officers and S. J. Herrell, claims agent Knoxville Power & Light Company; J. S. Kubu, assistant superintendent accident department Cleveland Railway; L. F. Wynne, general claims agent Georgia Railway & Power Company, Atlanta.

Convention secretary, E. L. Lindemuth, claims agent Wilkes-Barre Railway.

These officers were unanimously elected.

President-elect Hyland in a few well-chosen words said that he greatly appreciated his election and hoped that he would receive the support and help of the members during the coming year.

A past-president's badge was then presented by Mr. Bennett to Mr. Muir, who suitably replied. The other officers were then installed. The meeting adjourned at 6:30 p.m.

Large Attendance at Purchasing Agents' and Storekeepers' Meeting

Thirty-five Men Attended the First Special Meeting Under the Auspices of the Standing Committee — Interest Was Well Sustained and Attendants Voted to Recommend the Appointment of Regional Sub-Committees

THE initial meeting of the committee of purchasing agents and storekeepers at a separate session was held Wednesday afternoon, Oct. 10. L. C. Datz, president of the Engineering Association, delivered an address of welcome. An abstract follows:

MR. DATZ'S ADDRESS

It is a pleasure to welcome you here this afternoon at this your first special session of purchasing agents and storekeepers under the auspices of the American Electric Railway Engineering Association.

This has been an eventful year for the purchasing agent and storekeeper contingent of our association. This is evidenced by the interest shown by your committee throughout the year and by its splendid report to be submitted for your consideration at this convention.

Your committee has functioned well, and at the very outset I anticipated that it would, from the tone of a letter received from your chairman, accepting the appointment to head this committee.

The attendance at this meeting convinces me that the approval given you by the executive committee of the Engineering and American Associations to hold such a meeting was fully justified. You are to be congratulated on the fruit of your efforts to bring your colleagues together from all parts of the country.

In getting this approval your committee showed a marked ability as lobbyists. When I submitted to the American executive committee for approval the request of your committee to hold a special session, this request having previously been unanimously approved by the Engineering Association executive committee, I found that individual members of your committee had thoroughly sold the idea of the special session.

And so I say that a gathering of such a representative body of purchasing agents and storekeepers is certainly worth while, and, quoting from your report, I am sure that this is an excellent opportunity to vitalize this branch of the association for the common good of the member companies and the purchasing and storekeepers individually."

I want you to feel that the purchasing agents and storekeepers have a definite place in our association and in our conventions.

A roll call was taken in order that a permanent record would be available showing the attendance. Thirty-five members were present.

In order to promote constructive discussion, B. J. Yungbluth, chairman of the committee, read the entire report.

Work Planned by Section

A few years ago a group of purchasing agents complained to the American Electric Railway Association that purchasing agents and storekeepers were not being given any recognition, and though their affiliation was with the Engineering Association, the latter made no provision for them.

The outcome of this complaint was that at the 1919 convention, arrangements were made for the purchasing agents and storekeepers in attendance to hold several meetings, so they could determine what they wanted. It was finally decided, as a result of these meetings that the interests of this group could best be served by a standing committee to be known as the "Committee on Purchases and Stores" affiliated with the Engineering Association, which plan was adopted at the 1920 convention.

One of the first subjects assigned to it was a material classification for electric railways. There was evolved in collaboration with the stores accounting committee of the Accountants Association, the material classification as embodied in the joint committee's report on stores accounting presented at the 1921 convention. It was reconsidered and amended by this year's committee, which recommends that it be adopted. It is expected that such action will be taken at this convention.

This committee also made arrangements for and inaugurated the Purchases and Stores Question Box in *Aera.*

It is suggested that all purchasing agents and storekeepers endeavor to answer the published questions, and to furnish new questions from time to time. If this is done, we have no doubt that interest will be stimulated and maintained, and continued success will be assured for this feature.

The subject, "Proper Methods for Taking Periodical Inventories, with a View to Adopting Standard Forms," was reported on at the 1922 convention. The subject was continued and referred to this year's committee, which reviewed both reports presented by the previous committees, and recommends for adoption by member companies, the material classification and the stock book system, as suggested.

The aim of the committee is to see that purchasing agents and storekeepers are properly recognized at all times in the association's proceedings, to consider subjects of interest to the industry at large, and when recommendations are made, endeavor to have same put into effect, and carried out.

Discussion on the report was comprehensive, indicating that many had studied the advance report with an idea looking to constructive commendation. It was brought out that an increasing number of companies are arranging their stockrooms in order to adopt the classification of accounts as recommended for standard by the committee. G. H. Harris, Oakland, Calif., led the discussion with a paper explaining the methods as used on his property, particularly the application of the recommended stock book to the stores' department. With this stock-book method, which, by the way, is not an accounting feature, it is possible to know exactly what is on hand in the storeroom. In further amplifying the report, Mr. Yungbluth stated that the report contained tried methods by which it is possible to do away with the "bugaboo" yearly inventory.

Figures on the expense of installing physical changes in his company's stores department, making possible the adoption of the committee's recommendations, were given by W. C. Bell, Virginia Railway & Power Company, Richmond. In the past year $2,500 has been spent, this being the first of a total of $5,000 necessary to place the department on an efficient operating basis. A. E. Scott, Philadelphia, Pa., stated that a reduction of $500,000 had been made during the past year in stores department investment, and during this same period a payroll reduction of $25,000, or 31 per cent of the whole, had been effected.

As no corrections were suggested, the entire report was approved, with the recommendation that it be submitted to the Engineering Association for formal action.

A progress report of a sub-committee on questionnaires was given by W. N. Ford, Memphis, Tenn.

HISTORY OF THE COMMITTEE ON PURCHASES AND STORES

W. H. Staub, Baltimore, Md., outlined the history of the committee on purchases and stores. This is the outgrowth of a plan adopted at the 1920 convention. To date, the activities of the committee have been confined principally to the materials classification and the perpetual inventory. The committee has furnished questions for the question box in *Aera*, which have brought out a great deal of valuable information. The members should co-operate by furnishing and answering questions.

H. H. Lloyd, Indianapolis, Ind., suggested that the work of the committee could be expanded through the agency of small sectional sub-committees. This suggestion met with approval and a motion was passed requesting the incoming committee to appoint regional chairmen. Each of these would form suitable committees, consisting of men who could get together easily.

P. F. McCall, Chicago, Ill., then read his paper on "Proper Control and Handling Materials and Supplies." This appears in abstract elsewhere. He was followed by J. P. Dick, Atlanta, Ga., who suggested that the questions submitted for the question box be utilized in the discussions of the committee. He read a list of suitable questions which he had prepared. He stated further that meetings like this furnish a great opportunity for purchasing agents and storekeepers, providing for them a quorum for their discussions. Previously there was no place into which they particularly fitted at the conventions. The purchasing agent is responsible for the expenditure of large sums of money and needs the opportunity for discussion such as this committee provides.

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New American Executive Committee Holds First Meeting

THE first meeting of the new executive committee was held at the Marlborough-Blenheim Hotel, Atlantic City, on Thursday afternoon, Oct. 11, the final session of the American Association having been held that morning. Britton I. Budd, the new president, introduced the new members of the committee, who were as follows:

J. H. Hanna, Washington, D. C., and H. B. Flowers, New Orleans, representing the railways; E. F. Wickwire, Ohio Brass Company, and Cornell S. Hawley, Consolidated Car Heating Company, representing the manufacturers, and H. A. Johnson, new president of the Engineering Association. J. K. Punderford, new president of the Transportation & Traffic Association, and W. H. Hyland, new president of the Claims Association were not present. E. M. White, new president of the Accountants' Association, was represented by W. L. Davis, first vice-president.

Other members of the executive committee present were W. H. Sawyer, F. R. Coates, J. N. Shannahan, C. E. Morgan, R. P. Stevens, J. P. Barnes, J. G. Barry, C. R. Ellicott, A. A. Hale, H. D. Shute, and the following past-presidents: C. D. Emmons, A. W. Brady, R. I. Todd, C. L. Henry and Gen. George H. Harries.

Executive Secretary Welsh reported the final registration figures at the convention to be 4404, which he said beat all previous records. President Budd appointed a committee to make nominations for a member of the executive committee to fill the vacancy made by the elevation of R. P. Stevens to the position of fourth vice-president, the term of the new member to expire Oct. 31, 1924. The committee appointed for this purpose was R. P. Stevens, J. P. Barnes and R. I. Todd.

Mr. Shannahan read the report of the committee on subjects and meetings, which was approved as it appears in another column.

A letter was then presented from H. W. Alden, president Society of Automotive Engineers, suggesting definite co-operation between that body and the railway engineering association in matters of bus design. In discussing this, reference was also made to the suggestions of Alfred Reeves, general manager National Automobile Chamber of Commerce, made in his address before the American Association at Atlantic City, urging co-operation between the railway association and this body. In view of these suggestions the executive committee decided to appoint a committee to consider broadly the question of the relationship of the American Electrc Railway Association with the automotive industry. The committee named for this assignment is composed of L. S. Storrs, chairman; C. D. Emmons, F. R. Coates, R. P. Stevens and J. G. Barry.

President Budd was also authorized to appoint a new committee to award the Charles A. Coffin prize for the year 1924.

The executive committee approved the application of the following companies for membership in the association:

Osgood-Bradley Car Company, Worcester, Mass.; Pittsburgh Testing Laboratories, Pittsburgh; E. R. Caldwell & Son Brass Company, Inc., Syracuse; the Western Ohio Electric Company, Inc., Lima, Ohio; Gustave Schaefer Wagon Company, Cleveland; Bacon Safety Fender Company, Philadelphia; Wellman-Seaver-Morgan Company, Columbus, Ohio.

The membership of the association in the National Industrial Conference Board was continued for another year.

The president was authorized to delegate members of the executive committee to attend the annual meetings of the state and sectional association as representatives of the American Electric Railway Association.

The referendum of the United States Chamber of Commerce on reforestation was turned over to Mr. Shannahan, chairman of the policy committee, with power to act, after consultation with the wood preservation committee of the Engineering Association.

C. E. Morgan presented an application with some fifty signatures for a community section of the American Electric Railway Association in Greater New York, to be known as the Metropolitan Section of the American Electric Railway Association. The executive committee approved. Mr. Morgan reported that it is also likely that application for other sections will shortly be made.

Mr. Henry requested and was granted authority to appoint a subcommittee of the National Relations Committee consisting of members of that committee and also non-members to have charge of the association's appearance at the hearing before the Interstate Commerce Commission on Nov. 7 in Washington on the subject of depreciation.

General Harries requested the committee to appoint a representative to attend the meeting and assist in the work of organizing a national committee of national defense. Col. E. J. Blair, Chicago Elevated Railroads was appointed.

President Budd was authorized to appoint a committee to consider the location of the midyear meeting. He named the following men: J. P. Barnes, J. H. Hanna, Edward Dana, E. B. Meissner, D. W. Pontius, H. B. Flowers, G. H. Clifford, M. B. Lambert, E. P. Waller and L. E. Gould.

The next meeting of the executive committee will be held at headquarters, New York City, at 10 a.m., Friday, Nov. 16.

Accountants' Association Proceedings

W. G. Nicholson
Retiring President

Budgetary Control of Expenditures, Classification of Accounts for Bus Operation, and the Value of Operating Reports to Executives Were Leading Topics—Co-operation with Other Associations Urged

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E. M. White
President-Elect

THE first order of business at the opening session of the Accountants' Association, Tuesday afternoon, Oct. 9, was the annual address of President W. G. Nicholson. An abstract follows:

Address of President Nicholson

The business of providing transportation for the public is useful and honorable. Without adequate transportation facilities our large urban centers would not exist as they are today, and the rural sections of the country would return to the isolation of former days.

It is a business which is not nourished on the misfortunes of the public but rather lends to the prosperity and well being of the communities served.

The thought uppermost in my mind during all of this year has been the devising of some way to arouse renewed interest in the work of the association and its annual gatherings. One step was taken in this direction by the appointment of an attendance committee which, following the plan adopted by the Claims Association, covered almost the entire country. It is hoped that a large attendance will result from the splendid work of this committee.

It has been suggested by Mr. Welsh, executive secretary of the American Association and secretary of this and the other affiliated associations, that some plan be arranged making it possible to have the Accountants' Association represented at the meetings of the executive committee of the American Association. The president of your association is of course a member of this executive committee. It is suggested that if it is not possible for him to attend he may delegate one of the vice-presidents to act in his place. I am heartily in sympathy with this idea. I think such an arrangement will be of great benefit to our association, and I hope the incoming officers will join Mr. Welsh in fostering the adoption of this plan.

The work of this association has been of lasting benefit to the industry. Prior to its organization there was little or no uniformity in the accounting practice of the street railways and much constructive work was required. A survey of the papers read and discussed and the work performed by its various committees reveals the birthplace of most of the methods in use today.

The public utility accountant of today is more than a bookkeeper. His responsibilities are great. He must be well informed in all of the various branches of the business, and although public utility accounting practice has been largely standardized, he is constantly confronted with new problems. Nowhere is the opportunity offered to discuss these problems such as that afforded at these conventions.

Much constructive work remains to be done by this association. Matters of immediate interest will be reported on by your committees at the meetings this week and ample opportunity will be given each member for the expression of his views. It is hoped that all will participate actively in the discussions which arise. The thought you have in mind and hesitate to express may be the most vital and important contribution to the subject.

Report of Secretary-Treasurer Presented

Following the president's address the report of the executive committee was presented and accepted.

O. H. Bernd presented the annual report of Secretary-Treasurer J. W. Welsh, who was unable to attend the meeting. In his report Mr. Welsh called attention to the fact that this is the first year he has acted as secretary of the Accountants' Association, and spoke of the closer degree of co-ordination made possible by this new connection. He also called attention to the service available by the Association's Bureau of Information and the Question Box in *Aera*.

The report of the secretary-treasurer was then adopted.

The report of the committee representing the Accountants' Association at the annual convention of the National Association of Railway and Utility Commissioners was presented by W. L. Davis. An abstract of the report as given by Mr. Davis is presented below:

Report on Utilities Commissioners' Convention

The report of the committee to represent the Accountants' Association at the National Association of Railway and Utilities Commissioners is intended to summarize the subjects brought up at the annual convention held at Detroit during the week of Nov. 13, 1922. The chairman of the committee attended this convention. A member of the subjects discussed were of interest to the Accountants' Association. Among them are:

Standard classification of accounts.

Segregation of accounts between transportation and non-transportation activities—pertaining to express and other contract carriers.

Motor transportation, with particular reference to classification of accounts and a suggested general law to cover this field.

Recent valuations of steam railroads, with particular reference to figures representing appraisals of land and right-of-way.

Methods for keeping valuation data up to date.

Division of railroad valuation data to show subdivisions by states.

Depreciation reserve (with reference to telephone companies only).

In connection with standard annual reports there has apparently been no action taken by the Commissioners' Association, but during the past few years there have been published standard classifications of accounts by that association to cover electric companies and other utility corporations. No such action covering the requirements of electric railways has yet been taken, but it has been considered.

In this connection the committee made a brief review of the principal points in the National Association classification for electric companies as compared with the 1914 classification for electric railways prescribed by the Interstate Commerce Commission. No very important points of difference were noted, with the exception of the requirements for depreciation or retirement reserves. The classification prescribed by the

National Association of Railway and Utilities Commissioners is more specific than the I.C.C. classification, and in the explanatory text the Utilities Commissioners' classification states that the reserve should in all cases be sufficient to provide during a period of years a reserve against which can be written off all losses sustained upon the retirement of property for any cause whatsoever. This classification also provides that the cost of dismantling or removing abandoned property may be charged to the retirement reserve, while the I.C.C. classification states that the expenses incident to the retirement shall be charged to profit and loss. The former classification also states that the corporations may equalize from year to year through the creation of adequate reserves the losses incident to important retirements of buildings, structures and other property units. The I.C.C. classification is not quite so specific.

There are some points of difference between the balance sheet accounts and income accounts of the two classifications, but these are of a minor nature and consist principally of the manner in which the accounts are grouped.

In view of the fact that the National Association of Railway and Utilities Commissioners had been preparing these standard classifications, it might be well for the Accountants' Association to defer any action toward the preparation of standard annual reports until the commissioners take final action concerning a standard classification.

Under the subject of valuation is the obvious necessity of detailed construction records reflecting the cost of property additions by units. It is also desirable to establish methods of securing either actual or approximate book values of material retired from service.

During the discussion of the matter of depreciation it was generally conceded that some effort should be made to ascertain whether or not public service corporations could, by excessive charges, build up depreciation reserves which would include elements representing more than the actual cost of the units included in the plant account.

The report was signed by C. S. Mitchell, B. W. Fernald and W. L. Davis, chairman.

Following the presentation of the report there was some discussion on the subject of segregation of values by states, applying to roads that engage in interstate commerce. It was voted that the report of the committee be adopted and that a final report be printed and issued within sixty days after the convention of the National Association of Railway and Utility Commissioners.

Budgetary Control

The report of the committee on Budgetary control was presented by T. B. MacRae, general auditor Chicago Elevated Railways. The report follows in abstract:

The committee is inclined to recommend restricting the term "budget" to expenditures and the word "estimate" to revenues.

Any discussion of budget control will fall naturally into two divisions: First, estimated revenues; second, expenditure, both operating and capital.

These two again may be divided into four heads: First, period covered by budget or estimate; second, originating source; third, authority; fourth, checking budget or estimate.

Period—As, in our industry, comparisons are made month by month, and reports are made annually, the calendar year appears to be best period for which a budget should be prepared. In addition to the annual budget, the committee believes the best results can be secured by also submitting a monthly or a periodic budget. It is essential to a budget system that all estimates be made before the close of the year for the following year, or as soon as possible after the first of the year.

Authority—On a small property the auditor will take charge of the budget, confer with department heads, assemble the figures and submit the budget as finally agreed upon. On a larger system, it probably will be found more advantageous to refer all questions arising from the system to a special committee. The duties of this committee are advisory only and its findings must be approved or disapproved by the president. Such a committee will be referred to as the expense and budget committee.

Estimated Revenue—While it is theoretically impossible accurately to forecast the revenues of a railroad company, yet a reasonable estimate for an entire year can be made by months, with totals for year. A correct estimate of revenues is extremely important as the authorization of expenditures depends upon it.

In addition to the revenues, it is important that an estimate of cash requirements for the year be made, based upon the estimated revenues and expenses. The chief purpose of this estimate is to show the amounts necessary to meet taxes, rentals, fixed charges, dividends, and any financing the company contemplates.

Expenditures—Operating—The success of the budget system depends to a very great extent upon a departmental head having full information as to the cost of operating his department. Under a departmental system of accounts, this is under his control, but under the now general method of concentrating the accounting in the auditor's office, the departmental head is dependent upon the auditor, or a statistical department, for his costs.

Both operating and capital budgets should be prepared in two ways: First, the road, electrical and shop departments should map out a program for all work contemplated during the coming year and the estimated costs. This program should be prepared in as much detail as possible, showing the nature and location of the work. This estimate should also indicate whether the work is essential or can be deferred. The traffic department also may lay out a definite advertising program and ask for an appropriation. As the transportation department transports traffic offered to it, no fixed program can be made out. The accounting department should prepare an estimate of general expenses; second, all estimates should also be prepared by operating accounts. This is essential as there is no other way of checking the budget (unless a cost accounting system is in use) and for many accounts no program can be prepared.

Extraordinary expenditures arising during the year and not authorized by the budget, should be covered by some form of special authority. It is also often desirable that the cost of a particular piece of work be kept separate and not buried in some account number.

Expenditures — Capital — The same general plan followed in the operating budget must be observed. In general, capital expenditures can be outlined to better advantage than operating expenses. Where capital expenditures are authorized on a special form, statement should be made that such expenditures were, or were not, authorized by the budget.

Authorizing the Budget—All details prepared by operating heads as above outlined, and all working papers are submitted to the expense and budget committee. This committee also has before it the estimated revenues and cash requirements. It becomes their duty to pass upon the operating and capital expenditures, as it is assumed the estimates submitted by the accounting and treasury departments cannot be changed. It is also within the authority of this committee to determine whether expenditures are necessary or may be deferred. The budget authorized by the committee must necessarily come within the limits fixed by the estimated revenues and cash. This committee then makes a full report to the proper official stating what expenses have been allowed and what disallowed and the reasons therefor. When the budget has finally been approved, the operating expenses for the year are theoretically fixed and cannot be exceeded except by special authority. The purchasing agent should be informed of expenditures authorized in order that he may make proper contracts and place orders for material required.

Extraordinary operating expenses or capital requirements should be submitted in detail to the committee, which will pass upon them in the usual way.

Checking the Budget—Near the close of the month, each department head should send to the committee an estimate of the operating and capital expenditures for the following month and submit a statement showing how far the program has been completed. The treasurer should submit a statement of cash requirements. Statements should be prepared showing the budget authorized for month and period. As soon after the close of the month as possible, the accounting department should submit, for month and period, detailed earnings and operating expenses and capital expenditures, with any additional information the committee may require. Both the approved budget and estimated budget for month should be compared with actual expenses as shown by auditor, and discrepancies explained by department head. The committee will then report to the management the results obtained to date.

If the revenues fall below the estimates, or special financing is required, the committee and department heads are in a position to recommend reductions to be made in operating or capital. If on the other hand, earnings increase sufficiently, work that was deferred may be authorized.

Accounting Department—The following information should be furnished department heads for their information in preparing and checking budget:

First, detailed distribution of payrolls, by departments, if possible; second, full information as to material charged out; third, man hours by operating and capital accounts; fourth, in addition to above, co-operate with department heads to secure useful statistics and eliminate unnecessary information.

Conclusion — The committee recognizes that budgetary control is not primarily an accounting proposition. It is very largely a matter of policy to be determined by the president. The results secured in definitely controlling operating expenses far outweigh the labor and expense involved in working the system.

The report was signed by L. F. Rye, F. E. Belleville, C. A. Briggs, C. A. Dugle, T. B. MacRae, chairman.

Discussion

In presenting the report Mr. MacRae called attention to the statement regarding the monthly budget. He stated that the idea which he intended to convey in the report is that the department concerned was to submit an estimate of what it was doing during the following months. That is, the statement is merely an estimate of the monthly operating expenses. A written discussion was presented by C. R. Mahan of the Chicago, North Shore & Milwaukee Railroad.

In his written discussion Mr. Mahan called attention to the statement of the committee that it thinks the best results can be secured by also submitting a monthly or a periodic budget in addition to the annual budget. He believes that what the committee had in mind was a monthly or periodic program. In lieu of this Mr. Mahan proposed a "change of budget authority expenditure request." This request would be prepared by the department head and would indicate an appropriate detail the necessity or desirability of re-spreading the unexpended portion of the annual budget outlay.

The relationship between the program and the budget should be considered. The program need not cover every expenditure included in the budget. For instance, the traffic department might lay out a definite program for the amount that it anticipated spending for advertising, but it would not be necessary to file a program for the routine office expenditures and expenses incidental to this work, as they could be estimated with sufficient accuracy to spread over the period covered by the budget. Upon completion of the program they would be submitted along with the budget to the committee under whose direction the master budget would be prepared. If on completion of the master budget it should appear necessary to curtail the expenditures, the committee upon making its report to the president would suggest how and in what particulars the curtailment should be made. Upon the president's decision a final master budget would be prepared and receive the approval of the president.

Mr. Mahan also believes that the budget should be fixed for the year and should be strictly adhered to in so far as each department head can consistently carry out his part of the budget, in order that the goal set may be accomplished at the end of the budget period. However, if at any time during the budget period some extraordinary occurrences might arise, over which the carrier had no control, the effect of which would seriously distort the budget to a degree that it would be impossible to carry it out as planned throughout the year, then, in his judgment, it would be necessary to prepare a new budget for the remainder of the period. A most careful study should be made to forecast the revenues from transportation, and after all the factors are assembled they should be compared in detail with the revenue for each month of the previous year in order to determine that each element has received minute attention and nothing has been overlooked. The accounting department should prepare an estimate of the general expense requirements for the year, and although the expenses are subject to a rather wide range of fluctuation, the forecast can be made with a sufficient degree of accuracy so as not to impair the value of the budget, and any fluctuations therein are readily explainable.

R. O. Crowe, Los Angeles Railway, stated that his company follows in general the recommendations of the committee, but uses the budget as a guide only, the control being a daily analysis. He mentioned a possible difficulty with the budget that certain officials may watch it too closely and so make it difficult for department heads to obtain money for necessary expenditures. M. W. Glover, West Penn Railways, stated that his company had been very well satisfied with the use of a construction or capital budget and intended installing an operating budget next year. He called attention to a possible difficulty that operating officials might use for construction purposes amounts allotted to operation in the budget, provided they could keep their operations below the estimated amount. C. H. Allen, Stone & Webster Company, stated that there is a tendency to use the budget merely as a bogey. In summing up the discussion Mr. MacRae said that the budget gives information which can be presented to the president on the first of the month, and while it is impossible to give complete figures on the operations of the preceding month at such a time, it is possible to give the operating officials information that will assist them in laying out the work for the succeeding month.

A paper on "Construction Cost Accounting from the Viewpoint of Both the Contractor and the Company" was presented by Weston J. Hibbs of the U.G.I. Contracting Company. An abstract of this address appears elsewhere in this issue.

President Nicholson announced the following committees:

Nominating committee: M. W. Glover, F. E. Webster, I. A. May, T. P. Kilfoyle and W. E. Jones.

Committee on resolutions: T. B. MacRae, E. H. Reed and W. H. Lemons.

President C. D. Emmons, of the American Association, who was present at the session, made a few remarks to the members. He called attention to the interest being shown in the meetings and the splendid exhibits. He also pointed out that new accounts will have to be included to take care of the motor bus and perhaps later the aeroplane.

L. E. Lippett pointed out that this is the first time a president of the American Association has been present at a meeting of the Accountants' Association.

Wednesday's Session Accountants' Association

The first part of the afternoon was taken up in a joint session with the Engineering Association. A report of this was given in last week's issue in connection with that association. Following the joint session the Accountants' Association continued with its own business, with President Nicholson presiding.

In the absence of Mr. Wallis, the report of the committee on standard classification of accounts was presented by M. W. Glover. He stated that the tentative classification of accounts for motor bus operation, prepared by the committee, had been undertaken at the request of several companies which were thinking of going into this class of business, and that it was not expected that the committee would present a classification for immediate announcement. In fact, the committee requested that the association do not at this time adopt the report as a standard classification of accounts, one reason being that the committee had been working in close harmony with the representative of the Interestate Commerce Commission.

and felt that this suggestion should be presented to this representative to secure his co-operation in getting the classification adopted. The committee hoped that the association would offer suggestions and objections at the meeting, so that the committee could revise the report and then take it before the Interstate Commerce Commission. The report follows in abstract:

Standard Classification of Accounts

During the year the committee, as usual on request, co-operated with the Division of Accounts of the Interstate Commerce Commission in interpreting accounts.

Because of the growing use of buses by member companies the committee was requested to consider and present to the association a classification adaptable to the use of companies operating buses. This classification covers operating revenues and expenses and is drawn so it can be used by companies having either a bus department or a subsidiary bus company.

The committee has laid down the principle that such a classification should conform as closely as possible to that of the electric railway accounts, first, because it believes that it will be largely used by railway companies, and second, that the railway classification has stood the test of time and proved that it is well adapted to the transportation business. For profit and loss accounts, classification for balance sheet, and road and equipment accounts, the committee recommends that the electric railway classification be used.

The committee further states that in cases of companies operating a large number of buses a further diversification of accounts may be desired. The classification presented is intended to be basic and elastic and not elaborate, and if further detail is desired the classification can be elaborated as is done for class A, B and C electric railway companies and the form of the classification still maintained by using designating letters for the sub-account numbers.

The report is signed by Henry L. Wilson, William F. Ham, P. S. Young, M. W. Glover and Robert N. Wallis, chairman.

The classification of operating expense accounts for automotive transportation companies as presented and recommended by the committee for use by electric railway companies doing a bus business is divided into five primary accounts with thirty-one sub-accounts as follows:

Maintenance Plant and Equipment

B 1—Superintendence of plant and equipment.
B 34—Buildings, fixtures and grounds.
B 30—Passenger motor buses.
    a—Painting and varnishing.
    b—Bodies.
    c—Chassis.
    d—Tires.
    e—Engines.
    f—Storage batteries.
B 31—Freight, express and mail trucks.
B 32—Service trucks.
B 36—Shop equipment.
B 37—Shop expenses.
B 39—Miscellaneous equipment expenses.
B 40—Depreciation of equipment.
B 41—Equipment retired.

Power

B 53—Power.

Transportation

B 63—Superintendence of transportation.
B 64—Motor bus operators.
B 65—Freight, express and mail truck operators.
B 66—Miscellaneous service employees.
B 67—Miscellaneous motor bus service expenses.
    a—Lubrication.
    b—Other miscellaneous.
B 68—Station employees.
B 69—Station expenses.
B 70—Garage employees.
B 71—Garage expenses.
B 77—Loss and damage.
B 78—Other transportation expenses.

Traffic

B 79—Superintendence and solicitation.
B 80—Advertising.

General and Miscellaneous

B 83—General office salaries and expenses.
B 86—Law expenses.
B 89—Miscellaneous general expenses.
B 92—Injuries and damages.
B 93—Insurance.
B 94—Stationery and printing.
B 98—Rent of equipment.

The operating revenue accounts are divided into two primary accounts with six sub-accounts as follows:

Revenue from Transportation

B 101—Passenger revenue.
B 103—Special bus revenue.
B 109—Other transportation revenue.

Revenue from Other Operations

B 110—Station and bus privileges.
B 116—Rent of equipment, buildings and other property.
B 119—Miscellaneous.

Mr. Glover explained that the standard classification presented was prepared from that of an electric railway operating buses, but that it was much condensed, as the committee did not feel it necessary to include so many sub-accounts in its classification.

In the ensuing discussion, which was entered into by I. A. May, the Connecticut Company; T. B. MacRae, Chicago Elevated Railways; Mr. Coalthard, Toronto; N. E. Stubbs, United Electric Railway Company of Baltimore; A. G. Neal, Washington Railway & Electric Company; W. E. Jones, United Electric Railway Company, Providence; J. E. Heberle, Capital Traction Company, Washington; R. O. Crowe, Los Angeles Railway; E. M. White, Binghamton Railway, a number of questions were raised about individual accounts in the classification. Mr. Glover stated that he had been in the minority in desiring to include a larger number of sub-accounts than were recommended by the committee, but that the others felt these should not be included, but should be worked out for each individual property. A conference of the representatives of the Interstate Commerce Commission is scheduled for early in November, and it is considered desirable that any suggestions that are to be made be given to the chairman promptly.

The report was received as tentative and left with the committee for further consideration.

M. W. Glover presented the report of the committee on relations with other associations. This report follows in abstract:

Relations with Other Associations

In its report the committee states that during the year representatives have attended meetings of other associations in the gas and electric fields dealing with similar accounting problems.

As a number of member companies are interested in the operation of gas and electric properties, as well as electric railways, the committee suggests that any questions which may arise in connection with differences in accounting practices of the three classes of utilities be brought to its attention in order that the subject may be discussed with representatives of the other associations with a view of promoting uniformity in such practices.

The report was signed by L. T. Hixson, I. A. May, F. H. Sillick, F. E. Webster and M. W. Glover, chairman.

The chairman followed the report with the statement that he believes certain minor details should be worked out with representatives of the other associations in order to bring about greater uniformity. The report was adopted.

Usefulness of Operating Reports

A paper was presented by Edwin H. Reed, auditor of the Brooklyn City Railroad Company, on the subject, "Operating Reports and Their Usefulness to the Management." This paper is abstracted elsewhere in this issue.

The discussion on the paper was opened by President Nicholson, who said that it is his experience that much of the detail given the executive is useless; that is, the executive does not use it. His opinion was that in a majority of cases the preparation of such detailed reports does not justify the expense. J. J. Duck, Chicago Surface Lines, felt that when the executive asks for details they should be given regardless of the opinion of the accountant, although he felt that sometimes they are not useful in proportion to the cost. C. L. S. Tingley stated that much of the difficulty comes from the executive desiring a certain form of report for a specific study that may last for several months, after which the demand ceases. He may, however, forget to tell the accounting department to discontinue making up statements so that it will go on to eternity unless someone stops it. Mr. Reed defended his position, citing a number of cases in his own experience where a study of the detail figures had resulted in reduction of operating costs. C. E. Morgan, vice-president Brooklyn City Railroad, stated that the special reports rendered by the accounting department are to the executive what the sickroom chart is to the doctor. He is interested not in having something that indicates what the symptoms were thirty days ago, but in what the daily symptoms are, and that if he had to wait thirty days his patient would have died. He indicated that the executive has to form snap judgments, and sometimes merely glances at a report that may take an accountant several days to prepare. This should not discourage the accountant, as the vital point may be seen in an instant. He stated that his company has information of the business up to 2 o'clock in the morning of any particular day, which acts as a guide. While these figures may not be absolutely correct, they are accurate to within a fraction of a per cent and keep the finger of the executive on the pulse of the business. The accountant's report which comes along the twentieth of the month following is used as a check on the approximate figures.

Mr. Morgan also called attention to the value of the exhibits for accountants at the convention this year and suggested that operators stress this with the representatives of the various manufacturers of accounting devices during the year.

James Dalrymple, general manager Glasgow Corporation Tramways, stated that he places a great deal of dependence on detail costs. He does not believe that the accounting department can give the general manager too much detail.

Thursday's Session Accountants' Association

The third session of the Accountants' Association was opened by President Nicholson, who called for the report of the committee on stores accounting. This report, which was presented by Chairman R. A. Weston, follows in abstract:

Stores Accounting

The committee decided to give its attention this year to the matter of inventories of materials and supplies. It corresponded with the purchases and stores committee, and the two committees gave joint consideration to this subject.

After experience by some of the roads with the material classification recommended in the 1921 report, it was felt by the majority of the members of the purchases and stores committee that the classification as recommended, which was comprised of fifty-nine classes, could with some advantage in arrangement of material in storehouses, be somewhat amplified and enlarged into a classification of seventy-four classes. This classification is along the same lines as the one recommended and there is no change in matter of principle. It was finally voted to recommend the enlarged classification of seventy-four classes as a substitute for the classifications of fifty-nine classes. The revised classification is submitted in detail with this report.

The next matter was the use of stock books and this was substantially as recommended in the 1921 report, with the addition of detailed instructions showing how the stock book would be actually worked in the storehouses.

The third topic discussed was that of taking inventories. The recommendations of the committee on purchases and stores in regard to inventories is based upon the use of the stock book system and provides for taking the inventory in the stock book. It was agreed by the two committees that the more desirable practice is to take a complete physical inventory of the entire stock annually, on a date to be agreed upon by the general accounting officers and the head of the stores department, and it was agreed that the physical taking of the inventory should be handled by the stores department under the supervision and jurisdiction of the accounting department. It was agreed that all of the materials in the material and supply account should be inventoried, but it is possible that there may be some misunderstanding as to the definition of what is included, or what should be included, in the material and supply account. The committee feels that it is desirable to state quite specifically in the rules for taking inventory as to the inclusiveness of the inventory, so that there may be no misunderstanding on this score.

The committee feels that the rules for the annual physical listing of the materials and physical work in counting the materials had better be left to the committee on purchases and stores as it believes that the physical taking of the inventory should be handled by the stores department. As its contribution to this subject, the committee has recommended for insertion in rules which would apply to the taking of inventories on all street railways, paragraphs which relate to the inclusiveness of the inventory, and which state plainly the accounting department's jurisdiction in the matter, and which deal with certain adjustments that have to be made in inventories due to material received and issued during progress of counting, material received or issued which has not been entered on the company's books and such matters. These recommendations are briefly set forth below.

It is felt that a complete physical inventory once a year is very desirable. Even though a perpetual inventory system is maintained by the records and check is made from time to time by physical count, yet a complete annual inventory brings to light many things with regard to the stock of unapplied material on hand that are not brought to light in other ways.

The question arises as to the best practice of handling authorization material at inventory time. By this is meant special material, or unusual quantities of material carried in stock which may have been ordered for construction or improvement and betterment work. If such material has been once charged to the construction account, should it be included in the inventory? It is much better if facilities and organization permit to charge such material to general stores account when received and to the capital account when used. This should result in material being better checked up on receipt, better cared for and recorded, and give the stores department an acquaintance with the matter that would be advantageous.

Another question that arises is with respect to the supervising of the inventory by the accounting department. In view of the fact that the chief accounting officer should satisfy himself of the substantial correctness of the inventory, and has to certify to the correctness of the company's balance sheet on which the inventory is one of the chief assets, it is desirable that the taking and the completing of the inventory should be supervised and directed by the auditor's representative.

The manner of adjusting the inventory for the stock issued during the progress of the inventory may be handled in either of two ways as proves most satisfactory locally. Any material issued from a bin after the count has been put on the card up to and including the inventory date shall be put on the card showing the date of issue. Similarly for any material received and placed in the bin. If the count for a bin has not been made before the inventory date, all material issued from and including the inventory date to the date of count must be placed on the bin card, and similarly for material received and placed in the bin.

Or all requisitions for material issued during the progress of the inventory should be rubber-stamped "Before" or "After" opposite each item issued, the stamp "Before" to be shown opposite each item issued after the counting has begun and before the particular item was counted, and the stamp "After" opposite each item that is issued after the item has been counted.

The inventory quantities will be adjusted by additions or deductions called for by the above records.

All materials received prior to the inventory date, whether on hand and in inventory, or whether issued and used, for which no invoice has been received, should be listed on separate sheets, and this should be checked against the receiving record to make sure that the list is complete. The material on hand should be included in the inventory. This list should be sent to the accounting department immediately after the last invoices have been sent in for the month's account, and the auditor should charge general stores account with the value of the list in the month's account in which the inventory is being taken, setting up on the books the same amount as a credit to accounts payable or some other appropriate account, and the invoices as they are passed for the material on these lists should be charged to accounts payable and not to general stores account. This list should be made up in detail showing date received, name of shipper, quantity, description, price and value. If a copy of the invoice or a shipping memo has been received the date and amount should be shown and a reference to the purchasing agent's order number.

A detailed list should be made of any invoices taken into account prior to the inventory date for which the material has not been received prior to the inventory, such as invoices for material in transit passed in order to save the discount. A detailed list will also be made of all materials shipped away or issued and used which for any reason have not been billed or charged out. These lists will be treated as additions to the inventory.

In pricing the inventory the last recorded price should be used unless it should appear that the inventory quantity is made up of more than one lot, and at different prices, in which case the average price shall be figured and used.

All labor and material on incompleted shop orders must be entered on inventory sheets separately by shop orders and checked with the material in process of manufacture.

The report was signed by C. L. Bartlett, C. J. Bent, C. H. Caskey, A. E. Hatton, J. Scott Pardoe, J. B. Walker and R. A. Weston, chairman.

CLASSIFICATION OF MATERIAL AND SUPPLIES

Way and Structures

1. Ballast.
2. Ties.
3. Rails.
4. Rail fastenings.
5. Special work.
6. Track tools, power and hand.
7. Building and paving materials.
8. Sand and gravel.
9. Track salt and sweeper rattan.
10. Lumber and timber for way and structures.
11. Castings and forgings—wrought and finished not otherwise specified for way and structures.
12. Foundry supplies.

Power Generation and Distribution

13. Fuel.
14. Boiler parts.
15. Engine and turbine parts.
16. Generator and rotary converter parts.
17. Switchboards and switchboard equipment.
18. Ash and coal handling machinery, hoists, derricks, cranes, etc.
19. Mechanical and electrical devices.
20. Storage battery parts.
21. Wire and cable for production, transmission and distribution of power.
22. Wire and cable line accessories.
23. Line poles.
24. Track bonds and accessories.
25. Signal, interlocking and telephone materials.

Equipment

26. Lumber and manufactured woodwork.
27. Car wheels.
28. Car axles.
29. Brake shoes.
30. Drawheads, automatic couplers and journal boxes complete.
31. Service car materials.
32. Iron and steel bars, sheets and shapes.
33. Pipe, conduit and tubing.
34. Metals.
35. Castings, brass and other non-ferrous metals.
36. Castings, malleable iron.
37. Castings, gray iron and steel.
38. Forgings.
39. Springs.
40. Bolts, nuts, nails, etc.
41. Pipe and conduit fittings.
42. Gears, pinions and gear cases for railway type motors.
43. Bearings.
44. Armature and field coils for railway type motors.
45. Railway type motor parts.
46. Controllers.
47. Contactors, reversers and relays.
48. Fuse boxes, resistances, electrical couplers, circuit-breakers, lightning arresters, and other power fixtures for cars.
49. Trolley and third-rail equipment.
50. Air-brake materials.
51. Door and step control devices.
52. Heaters.
53. Mechanical and electrical devices for cars.
54. Car trimmings.
55. Paints and varnishes.
56. Glass.
57. Wire and cable for cars and buildings.
58. Insulating materials.
59. Electrical supplies.
60. Machinery and repair parts.

General

61. Oil house materials, chemicals and compounds.
62. Automobile, garage and stable supplies.
63. Canvas, leather, rubber and paper supplies.
64. Brooms and brushes.
65. Hardware and tinware.
66. Tools, all kinds, except machine and track tools.
67. General supplies.
68. Stationery and printing.
69. Furniture and fixtures.
70. Material in process of manufacture.
71. Scrap—non-ferrous metals.
72. Scrap—ferrous metals.
73. Scrap—miscellaneous.
74. Containers.

Following the presentation of this report the program was interrupted so that the association could hear the address of Dwight N. Lewis, president National Association of Railway and Utility Commissioners. Mr. Lewis' paper appears elsewhere in this issue.

Returning to consideration of the report of the committee on stores accounting, a written discussion was presented by W. L. Davis, an abstract of which follows:

The value of a material classification is generally recognized. It not only furnishes the executive with valuable information in controlling purchases, but it also furnishes the storekeeper and the accounting department with an excellent medium for inter-departmental checking, particularly at the time of the annual inventory. A practical difficulty is involved in applying the classification to the stores accounts, in that the distributions, both debits and credits, are subject to clerical errors. Unless carefully watched, differences in distribution may exist to such an extent that the accuracy of the balances may be affected seriously. It is possible to take care of this by establishing a set of code numbers for the various items of material. If code numbers are not used the classification numbers may be applied at the time the material is ordered. It might also be well to suggest that a modified or abridged classification of stores accounts be prepared for the use of smaller companies or for any company which does not desire to use the very complete classification outlined by the committee.

It might be well to mention that the stock book suggested by the committee does not provide for the value of the material, and under those circumstances it is obviously necessary to establish another record for that purpose. The establishment of such a record and the methods to be used in keeping it up to date and in step with the stock book is a study in itself. Such a record appears to be necessary if physical inventories are to be compared accurately with the general books, as it is obvious that the most accurate comparisons can be obtained when the physical stock and the general books are known to be represented by the same elements. The committee has covered the matter of inventory in a complete and comprehensive manner and there seem to be very few comments in order.

There is no doubt that there is an unrecorded asset often represented by the value of material charged out prior to its use, said Mr. Davis, but in stating that such material should be taken into the inventory it might perhaps be possible to overstate the inventory to some degree. If material ordered for a specific purpose and charged to the job is not used for a few months, and an inventory is taken in the meantime, the propriety of changing the distribution is open to question. The fact remains that the material was purchased as a part of a piece of work, and the money paid for it represents a part of the cost. Under these circumstances it might be preferable to omit the material from the inventory. On the other hand, should a stock of material be bought for any of several purposes and the cost thereof not be chargeable to any one account, the value of such material should be included in stores, and under such circumstances the original charge should have been made to stores.

W. E. Jones stated that the classification given by the committee was quite thoroughly in accord with the classification with which he was familiar. It was moved that the committee be continued, and that the executive committee be requested to take the matter up with the Purchasing and Stores Association in order that any duplication of work may be eliminated.

Resolutions

Chairman MacRae of the committee on resolutions read the report of his committee. Appreciation was expressed for the work of the officers and the executive committee of the American Association in preparation for and during the 1923 convention. Appreciation was also expressed to President Nicholson and the other officers for the interest taken and the work done in preparing the program and securing papers and speakers. The thanks of the association were extended to members of the committees and to those persons who prepared and read papers. The ELECTRIC RAILWAY JOURNAL was thanked for its interest in having representatives at the meeting and in reporting proceedings in the various issues. Special appreciation was expressed for the presence at the meetings and remarks made by Messrs. Welsh, Dalrymple, Morgan and Tingley. Thanks were extended to O. H. Bernd for his work as secretary during the convention.

Nominations

The committee on nominations, M. W. Glover chairman, submitted the following for officers of the Accountants' Association for the ensuing year:

President, E. M. White, treasurer Binghamton Railway Company.

First vice-president, Wallace L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa.

Second vice-president, J. J. Duck, general auditor Chicago Surface Lines.

Third vice-president, Walter Shroyer, secretary Union Traction Company of Indiana, Anderson, Ind.

Executive Committee: L. E. Lippitt, auditor Auburn & Syracuse Electric Railway, Auburn, N. Y.; T. B. MacRae, general auditor Chicago Elevated Railways; O. H. Bernd, secretary Des Moines City Railway; E. H. Reed, auditor Brooklyn City Railway.

These officers were duly elected.

President Nicholson turned the meeting over to President-elect E. M. White, who spoke a few words and then asked for expressions from the newly elected officers. These all indicated their desire to help Mr. White in every possible way and to further the interests of the association.

President White made the suggestion that a delegation among the accountants get together at one hotel in order to become better acquainted apart from the regular meeting. No formal action was taken on the matter.

Biographical Sketches of Newly Elected Officers

The New President of the Claims Association

STEP by step William H. Hyland, claims agent for the Fonda, Johnstown & Gloversville Railroad of Gloversville, New York, who was elected president of the Claims Association at Atlantic City, has climbed the ladder of railroad work. He broke into the railroad "game" some thirty-five years ago. This was when he secured employment as a brakeman on the Tioga branch of the Erie Railroad, a line handling a large part of the railroad traffic for northern Pennsylvania and southern New York State. He was twenty years of age at the time.

It is only a step from brakeman to conductor, but many men never make it. Mr. Hyland made the advance to freight conductor on the same branch in less than a year. The next step took a little longer. It was three years this time. Yardmaster for the Erie Railroad at Corning, N. Y., was the post to which Mr. Hyland advanced. There he remained for several years before being transferred to Buffalo, N. Y. He then left the services of the Erie Railroad and became connected with the West Shore Railroad as conductor on trains running between Newark and Frankford, N. Y. Two years later he entered the services of the Fonda, Johnstown & Gloversville Railroad.

To those who did not know Mr. Hyland well this change looked like a backward step, for he began his service with the Fonda, Johnstown & Gloversville Railroad in the capacity of passenger brakeman. But Mr. Hyland had not changed from one road to another just for the sake of change, no matter what the outward evidence might appear to be. It was opportunity for advancement that he sought, and as events have turned out it was opportunity that he found. Thus just a year after joining the Fonda, Johnstown & Gloversville Railroad he was advanced to freight conductor. Two years later he was again advanced, this time to passenger conductor, a position which he held until the Fonda, Johnstown & Gloversville Railroad started on the construction of its electric railway running between Gloversville and Schenectady. Mr. Hyland was then appointed trainmaster and put in charge of all steam trains engaged in the construction of the new road. He remained in this position until the road was completed in 1903, when he was advanced to claims agent, a position he holds until the present day. His service with this company covers a period of twenty years.

Mr. Hyland is well known in fraternal circles, not only in Gloversville and other cities where he was employed, but throughout the entire state of New York. He was exalted ruler of the Benevolent Protective Order of Elks of Gloversville for two consecutive terms and also held the office of first vice-president of the state of New York Order of Elks in 1916. No small part of the success of the Liberty Loan and other drives throughout his section of the country during the World War was due to his untiring efforts.

Elmer M. White

ASSOCIATION work is not new to Elmer M. White, just elected to be president of the American Electric Railway Accountants' Association. Ever since he entered the electric railway field many years ago Mr. White has contributed of his knowledge to the industry and to the association, and once before he was an active officer of the Accountants' Association, serving as secretary from the year 1904 to the year 1908.

Mr. White is one of the real old timers, in the sense that his connection with the industry dates back to 1885. In that year he entered the service of the Hartford & Wethersfield Horse Car Railway at Hartford, Conn., and remained with that company for a period of twenty years. For a short time, namely from 1905 to 1907, he was in the South as treasurer of the Birmingham Railway, Light & Power Company, but in 1907 he returned north to accept appointment to the Coney Island & Brooklyn Railroad as auditor. This road was then not included in the system of the Brooklyn Rapid Transit Company, but it embraced some of the key lines of the city, Smith Street, De Kalb Avenue and Franklin Avenue, then highly developed and doing a gross business per annum per mile of track that ranked it very high as both a gross and a net earner. After serving with the Brooklyn road for six years Mr. White was made treasurer of the Binghamton Railway, Binghamton, N. Y., where he has since been located. Mr. White knows accounting, knows association procedure, and knows accountants, and he enters upon the work of president of the association with the hearty co-operation of the electric railway accountants, personally expressed to him.

Meeting of New and Old Engineering Executive Committees

Old Engineering Executive Committee Meets

A MEETING of the executive committee of the American Electric Railway Engineering Association was held at the Marlborough-Blenheim Hotel, Atlantic City, N. J., Oct. 7. The members present were: L. C. Datz, H.A. Johnson, C. H. Clark, C. R. Harte, Daniel Durie and R. C. Cram. J. W. Welsh was present during a part of the meeting, and G. C. Hecker acted as secretary.

Mr. Harte, who had been appointed to revise the rules for the adoption of standards, stated that in his judgment the matter should be held in abeyance pending definite decision regarding the association's policy on relations with the American Engineering Standards Committee. The matter was laid on the table.

Mr. Johnson, who had been appointed to study and report on the future work of the heavy electric traction committee, reviewed the work of the committee from the beginning. He cited the opinions of various members on this subject and recommended that the committee on heavy electric traction be continued, and that it keep the association informed of the progress in electric traction as applied to steam railroads. This will include the revision and publication of the Bibliography of Heavy Electric Traction and Electrification Data. The desirability of revising this bibliography yearly may be decided later.

He also recommended that the committee be assigned subjects of vital interest to electric railroads operating subway, elevated and heavy interurban service and that the number of this class of subjects be increased after next year. The membership of the committee should include representatives of companies operating elevated, subway and heavy interurban service in addition to representatives of electrified steam railroads and manufacturers. The executive committee approved these recommendations.

Mr. Scofield, who had been appointed to study and report on a policy to be pursued in assigning subjects to the power generation committee, recommended combining the power generation and power distribution committees into one committee to be called the power supply and distribution committee. There was a prolonged discussion, which resulted in the executive committee voting to maintain two committees, as follows:

(a) Power generation and conversion.

(b) Power transmission and distribution.

It was the sense of the executive committee that the co-operative work with other associations suggested by Mr. Scofield should be carried out by the first committee, so that the association members would receive the benefit of the studies conducted by N. E. L. A. and similar organizations.

Mr. Harte, who had been appointed to study and report on the advisability of forming a signal committee, stated that he believed the subject of signals could best be handled by a sub-committee of the power distribution committee. Mr. Cram stated that he was in favor of forming a standing committe on signals. The executive committee voted to assign the subject to the proposed committee on power transmission and distribution.

The secretary announced that H. H. Norris has accepted appointment as the association's representative on the sectional committee on preferred numbers of the American Engineering Standards Committee, and that R. C. Cram has accepted appointment as the association's representative on the sectional committee on the industrial sanitation code.

The invitation of Charles E. Heywood, standards department, Society of Automotive Engineers, to appoint a representative on the sectional committee on numbering of steel was accepted.

The invitation of Dr. G. K. Burgess. Director, United States Bureau of Standards, to appoint a representative on the sectional committee being organized to revise Parts 1 and 3 and Section 9 of the National Electrical Safety Code was also accepted.

The committee passed a resolution thanking President Datz for the photographs of past-presidents of the association, which he had framed and placed in the headquarters office.

The secretary announced that the recent letter ballot indicated the executive committee was in favor of the appointment of a representative on the joint committee of National Engineering Associations, to review the A.I.E.E. standards for synchronous converters.

A letter from H. H. George was read, recommending that the special committee on wood preservation be constituted a standing committee. It was voted that this be made a standing committee.

Meeting of New Engineering Executive Committee

THE first meeting of the 1923-24 executive committee of the Engineering Association was held at Atlantic City, Oct. 11. Members of the executive committee present were H. A. Johnson, C. H. Clark, R. C. Cram, C. R. Harte, Daniel Durie, R. H. Dalgleish, M. B. Rosevear and J. W. Welsh. Past-presidents F. R. Phillips, J. H. Hanna, H. H. Adams and L. C. Datz also attended. G. C. Hecker acted as secretary.

The report of the committee on subjects was approved with several amendments. The amended report as approved is published below.

Mr. Adams suggested the appointment of a committee of five to cooperate with the National Fire Protection Association in revising that part of the National Electrical Code dealing with rules for car wiring. Mr. Adams pointed out the opportunities for obtaining a reduction in insurance rates through proper wiring of cars to comply with the code and also pointed out the necessity for reasonable code requirements. The executive committee voted to appoint such a committee with the understanding that it did not conflict with the revision by the American Engineering Standards Committee.

The executive committee voted to appoint a special committee on individual membership in the Engineering Association. This committee is to be instructed to co-operate with the committee of the American Association on company section and individual membership. L. C. Datz was appointed chairman of this committee.

The executive committee voted in favor of the appointment of an alternate to the representative on the main committee of the American Engineering Standards Committee.

The executive committee voted in favor of the organization of a special committee on engineering symbols, to consist of a representative of each of the standing committees involved in the use of symbols. The committee is to be instructed to prepare its report in a suitable manner for inclusion in the Engineering Manual.

It was voted to request the American Society for Testing Materials to join with the association in submitting for approval as American standard, the specification for the manufacture of open-hearth steel girder rails of plain, grooved and guard type, Manual Section Wr 2d. This specification is understood to be in complete conformity with A.S.T.M. specification A2-21 as recently revised.

The suggestion of the committee on heavy electric traction that the bibliography be revised and simplified as suggested by Prof. R. B. Warner of Yale University and brought down to date was discussed. It was voted that the secretary take up the matter with Professor Warner and obtain an estimate of the cost of doing the work.

It was decided to continue the special committee on automatic substations for another year.

The request of the committee on power transmission and distribution that it be permitted to erect a trolley wire over the proposed rotary service testing machine of the welded rail joint committee for the purpose of making comparative trolley wire wear tests was discussed. It was voted to defer action on this matter until the next meeting, at which time it was hoped that the status of the proposed testing machine would be more definitely established.

The suggestion of the committee on power transmission and distribution that the association employ a research engineer or found a research fellowship at some university to study trolley wire performance and specifications, was discussed. Mr. Dalgleish stated that he thought the United States Bureau of Standards might be able to assist in this research work. It was voted to defer action on this matter until the next meeting and Mr. Dalgleish was requested to take up this matter informally with Dr. Burgess, director of the Bureau of Standards.

It was voted to approve the recommendation of the committee on power transmission and distribution to request the A. E. S. C. to organize a sectional committee on specifications for high strength, low conductivity, trolley wire. It was also voted that the Engineering Association request the A.S.T.M. to join in making this request and also in undertaking jointly the sponsorship for such a sectional committee.

President Johnson appointed the following sponsors for standing and special committees for the year.

Power Transmission and Distribution: M. B. Rosevear.

Special Committee on Automatic Substations: E. H. Scofield.

Buildings and Structures: C. H. Clark.

Power Generation and Conversion: E. H. Scofield.

Purchases and Stores: R. H. Dalgleish.

Heavy Electric Traction: C. R. Harte.

Way Matters: R. C. Cram.

Engineering-Accounting: C. R. Harte.

Equipment: Daniel Durie.

Wood Preservation: M. B. Rosevear.

Special Committee on Engineering Symbols: R. C. Cram.

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Subjects for Engineering Association

THE committee on subjects of the American Electric Railway Engineering Association submitted a list of assignments for this year's committees to the executive committee, which formally approved it at the meeting held Oct. 11 at Atlantic City. The list as prepared by the committee follows:

EQUIPMENT

1. Continue the study of helical gears, including long and short addendum teeth, web hole standardization and the whole subject of car gearing.

2. Continue the study of various devices for trolley contact and the effect

upon trolley wire. This subject is to be studied in co-operation with the committee on power transmission and distribution.

3. Review of Manual sections on equipment under the heading "Miscellaneous Methods and Practices." These are to be revised with the idea of including in the Manual any which may have sufficient value to warrant it.

4. Continue the study of spring supports for railway motors with a view to the elimination of undesirable types, and the standardization of the more desirable ones, in so far as possible.

5. Study existing practices in the matter of inspection periods for car axles with a view to developing a practicable set of rules, for inclusion in the Manual under "Miscellaneous Methods and Practices."

6. Study air brake tests conducted under the auspices of the Central Electric Railway Association and present a digest of the salient features.

7. Review of existing standards, with particular reference to the following Manual sections:

(a) Section Et 18a and Em 3a to bring them into conformity with the new wheel contours adopted at the 1923 convention.

(b) Revise the tables in Section Et 7b to bring them into conformity with the new wheel contours adopted at the 1923 convention, and expand the tables to permit obtaining standard flanges and treads in all of the standard diameters shown in present Table 1.

(c) Revise Sections Et 9b, Et 14b and Et 15b in accordance with the recommendations of the 1923 committee on standards.

WOOD PRESERVATION

1. *Specifications for Open Tank Treatment of Wood Poles*—The subject of open tank pole treating plants for small operating companies should be studied and reported on.

2. *Specifications for Brush Treatment of Wood Poles*—The committee is instructed to continue the study of this subject and report on the desirability of preparing a specification for a suitable grade of creosote oil for brush work.

3. *Specifications for Pressure Treatment of Wood Poles*—The 1923 committee submitted five specifications for information only. This committee is instructed to make a further study of these specifications with a view to their inclusion in the Manual.

4. *Perforation Process for Timber Treatment*—The 1923 committee felt that this method of treatment of timber had not become sufficiently standardized to justify making definite recommendations. The committee is instructed to make a further study of this subject.

ENGINEERING-ACCOUNTING

Continue the study of classification codes of items of work in construction and reconstruction so arranged that the I. C. C. account numbers may be readily adhered to. The purpose is to elaborate on the I. C. C. accounts so that at any time during the progress of or after the completion of a job the cost of any item may be determined.

HEAVY ELECTRIC TRACTION

1. Revise and bring up to date the bibliography of heavy electric traction and electrification data: rearrange the bibliography as outlined in the report of the 1923 committee for publication in pamphlet form.

2. Collect and tabulate data on: (a) Branch line electrification; (b) self-propelled cars, such as gasoline, gasoline-electric and Diesel-electric, as well as storage battery cars; and storage battery locomotives for yard work.

3. Study train operation with particular reference to articulated trains. Review and present information on existing articulated trains.

4. Make a study of connections between cars used in train operation, reviewing those in use to date and suggesting improvements in all types, including electric, mechanical and air couplers.

5. Review of existing standards.

BUILDINGS AND STRUCTURES

1. Continue the study of Electric Railway Terminals for both City and Interurban service — (a) Passenger terminals; (b) freight terminals for city and interurban service; (c) combination terminal.

2. Study designs of buildings for proper storage and maintenance of buses.

3. Review of existing standards.

POWER GENERATION AND CONVERSION

1. Continue the study of a uniform scheme of recording failures of power apparatus and interruptions to service originating within the generating station and the substation.

2. Continue the study of existing practices in the design and operation of automatic substations. This study should include the subject of remote supervisory control.

3. Study ventilation systems for automatic substation.

4. Review of existing standards.

PURCHASES AND STORES

1. Study and present information on a method of classification and sale of scrap materials to increase the revenue therefrom.

2. Study and report on the proper place for the purchasing and stores departments in a company's organization.

3. Review of existing standards.

POWER TRANSMISSION AND DISTRIBUTION

1. Review the subject of concrete pole design and maintenance.

2. Study dimensions of approach ears of flexible tips with a view to standardization of the ruling dimensions.

3. Study dimensions of various types of suspensions, with a view to standardization, particularly of the ruling dimensions.

4. Review the work of the 1923 committee on catenary overhead construction, other than for steam railroad electrification.

5. Prepare specifications for catenary suspension materials.

6. Trolley wire wear and composition —(a) Continue the study of the composition and the wear of trolley wire; (b) continue the study of trolley wire breaks from causes other than wear; (c) continue the study of various devices for trolley contact and the effect upon trolley wire. This subject is to be studied in co-operation with the committee on equipment.

7. Continue the study of temporary connections to trolley wire.

8. Continue the study of overhead construction for trackless trolleys.

9. Review existing standards. Special attention is to be given the existing standards on block signals. The committee on power distribution should bring these specifications into conformity with the best known signal practice.

WAY MATTERS

1. Continue the subject of standardization of frogs.

2. Continue the study of design of substitute ties in co-operation with American Railway Engineering Association.

3. Continue investigation of all forms of welded joints in co-operation with the committee on welded rail joints.

4. Study and submit design and specification covering solid manganese steel, electric over steam railroad crossings. This subject should be studied in co-operation with the track committee of the A.R.E.A.

5. Study the standardization of switches and mates.

6. Study and report on the need for and the desirability of adopting a narrow groove guard rail as standard.

7. Prepare design of standard hook head railroad spike.

8. Study surface hardening of rails in the mill and on the street.

9. Submit additional specifications covering design and manufacture of tie rods.

10. Review of existing standards. Special attention should be given to the following: (a) Ws 2a, "Rules for Determining the Gage of Track on Curves." This revision is necessary because of the adoption of new wheel flange contours as standard. (b) Wr 7a, specification for carbon steel rails of standard section. The committee should take up with the A.S.T.M. the matter of revising Section IV—Subsection 402—Page 6—so as to provide for the furnising of standard section rails in 60-ft. lengths.

UNIFICATION OF CAR DESIGN

Continue the subject of unification of car design.

UNIT METHOD OF VOTING ON STANDARDS

The work of this committee is to be continued.

AIR RESERVOIR SPECIFICATIONS

The work of this committee is to be continued.

Association News & Discussions

Concluding Sessions of Safety Council

The Automobile Hazard and Community Co-operation in Safety Movements Principal Topics Discussed—J. P. Barnes of Louisville Elected Chairman of Section for Ensuing Year

THE electric railway section of the National Safety Council concluded a very successful three-day meeting in Buffalo on Oct. 4, when James P. Barnes, president Louisville Railway, was elected chairman of the section for the ensuing year. The report of the meeting on Oct. 2 was published in the ELECTRIC RAILWAY JOURNAL of Oct. 6, together with a copy of a paper read at the Oct. 4 meeting by D. E. Parsons, general manager East St. Louis & Suburban Railway. Lack of space in the issue of Oct. 13, because of the need for reporting the Atlantic City convention, precluded the publication of a report of the concluding sessions of the electric railway section of the National Safety Council.

THE AUTOMOBILE HAZARD

The session on Wednesday, Oct. 3, was a joint meeting of the electric railway and public utility sections and was devoted to the subjects of the automobile hazard and valuable sources of information on accident prevention not generally utilized. More than 250 attended this session of the congress, which was held in the Fillmore room of the Hotel Statler, which is furnished with furniture taken from the former home of the late President Millard Fillmore. A. O. Mitchell, adjuster of the Northern Indiana Gas & Electric Company, Hammond, Ind., was chairman of the public utilities section and he acted as co-chairman with Mr. Truett.

James P. Barnes, president Louisville (Ky.) Railway, was the first speaker, his subject being "The Automobile Hazard."

Mr. Barnes began by referring to some recent statistics on automobile accidents, published in the *Literary Digest*. According to that paper a person is killed in the United States every fifty minutes by automobiles, and the prediction was made that before 1923 was ended one person out of every ninety in the United States would have been so killed or injured. Statistically, Mr. Barnes said, that statement is almost incomprehensible, yet the casualties are increasing so rapidly there must be some deep underlying cause for it. On the other hand, the record of accomplishment by law in some places has been good. Thus the speaker noticed recently in Cleveland that traffic seemed to observe the speed limits carefully and people used great caution in crossing the streets. Inquiry disclosed that Cleveland had established the plan of impounding the cars of speed ordinance violators and the careless driver had to pay storage for his car through the length of time he was forbidden to drive. The contrast with this condition and that in Buffalo was most marked.

Safety campaigns, the speaker said, have some effect, and it is noteworthy to see the effect they have upon children. Children think more simply and directly than grownups, and once they have accepted the conclusion, once they have come to believe a certain thing is dangerous because they have seen it in practice or been told by their parents or teachers they are more apt to be guided by that than the adult who has learned "to take a chance." The only real remedy is a restoration of "common horse sense" and a spirit of human kindness behind the steering wheel. Each person has a responsibility to society and other individuals, and this cannot be put off by the question: "Am I my brother's keeper?" So we must continue our safety campaigns and try to impress individuals with the fact that their duty to society is not only self protection but protection to others. We must also constitute ourselves centers of energy in the distribution of propaganda that the laws must be observed, and this world must become a place where each man will feel in himself some definite measure of responsibility for his fellow-men.

R. R. Hadsell, superintendent of transportation New York State Railways, Rochester Lines, and president Rochester Safety Council, in discussing Mr. Barnes' address, pointed out that the cause of most automobile accidents was recklessness or thoughtlessness of the driver rather than imperfections in the machine. Of course, a steering knuckle may break at times or a tire come off when it is particularly dangerous to have such a thing happen, but accidents are more often attributable, in the speaker's opinion, to a desire to beat the other fellow to a crossing or into a lane of traffic or else to indifference to the rights of others. Thus, railroad crossing accidents are alarmingly frequent, even where warning signs are conspicuously placed and there is an unobstructed view of the crossing for a considerable distance. The speaker had been impressed in reading accounts of such accidents, with the fact that in the majority of cases the persons involved had foreign names. This had led him to believe that many of them do not know the traffic laws, do not carry insurance on their cars, and often are not financially responsible for the damage they do through their negligence. One method of reducing this danger is strictness in the issuance of licenses and in the assessment of penalties for reckless driving.

Mr. Barnes' address was also discussed by H. L. Mitchell, vice-president West Penn Railways of Pittsburgh.

The principal speaker on the second topic of the day was W. F. Canada, director of engineering National Electric Light Association. He urged the need of engineering methods and organization in safety work. One step along this line has been a drafting of codes for protection against the fire hazard and other codes are in the making. Another step is in the compilation and study of statistics of injuries to show the kinds of work and the kinds of location where injuries occur with greatest frequency and severity and the percentages of persons that are injured. By these statistics it is possible to arrange for different safety practice methods where they are most needed.

The meeting on Wednesday morning was followed by a luncheon, presided over by Charles B. Scott, general manager Bureau of Safety, Chicago. The speakers discussed electric safety problems and included R. M. Searle, president of the Rochester Gas & Electric Corporation, Rochester, N. Y., and R. Russell Bowen, vice-president of the Washington Railway & Electric Company, Washington, D. C.

FINAL SESSION AND ELECTION OF OFFICERS

At the closing session of the electric railway section, National Safety Council, on Thursday, Oct. 4, James P. Barnes, president of the Louisville (Ky.) Railway, was elected chairman for the ensuing year. Mr. Barnes succeeds J. H. Truett, chairman of the safety committee of the United Railways & Electric Company of Baltimore, Md. H. M. Keyser was elected vice-chairman. He is secretary and claims attorney for the Washington Railway & Electric Company, Washington, D. C. He succeeds G. T. Hellmuth, claims attorney for the Chicago, North Shore & Milwaukee Railway, Chicago. M. W. Bridges, safety engineer for the Chicago Elevated Railways, Chicago, was re-elected secretary of the section. The election of the three was unanimous.

The Thursday session of the electric railway section of the congress opened with a round-table discussion on the topic "Co-operation of Electric Railways in Community Safety Activities." C. B. Scott of Chicago said that the electric interurban lines operating through a large number of small communities face a difficult problem because it is impossible to organize local safety councils in these towns and villages. He said, however, that it is not difficult to interest local citizens in safety work and that this volunteer service, while not expensive is often very effective.

Louis C. McBrayne, manager of the Massachusetts Safety Council, Boston, explained the activities of the safety work in his state through co-operation between electric railway lines and newspapers. He said that the big menace to electric railways is the motorist who shoots out at a side street and the auto driver who cuts in front of a car. He said that railways should encourage motormen to report careless auto drivers and said that in Massachusetts friendly letters are written to motorists thus reported by motormen, urging them to be more careful. He also urged electric lines to encourage their trainmen to become speakers on safety problems before local gatherings and added that if a general manager or railway executive spoke, the public would say, "he wants to save money for his road," but if a trainman did the speaking, it would be much more effective.

Mr. Barnes, president of the Louisville company, told the electric traction officials that not sufficient credit is given to platform men in the safety movement and that too much credit is taken by the executives who serve upon the safety committees. He told of a parade in Louisville where taxis were driven through the streets by twenty-four drivers who had not had an accident in from one to three years. The passengers in the cabs were trainmen in the employ of the Louisville company who also enjoyed non-accident records. He said the demonstration resulted in much good publicity and aided in the safety movement in that city.

After D. E. Parsons, general manager of the East St. Louis & Suburban Railway, St. Louis, presented his paper on "Safety Principles as Applied to the Individual Utility (see ELECTRIC RAILWAY JOURNAL, Oct. 6, page 568). There was a discussion, lead by A. J. VanBrunt, director of safety education for the Public Service Corporation, Newark, N. J. He said that too many electric railway executives pay little or no attention to safety work and he charged these officials with mismanagement and shortsightedness. He declared that safety work should not be spasmodic but should be carried on with systematic regularity. He said the saving due to safety work is greater than the outlay of money used to carry on such work and added that, "to cure is a voice of the past and to save is the voice of the future."

A. W. Koehler, director of safety New York State Railways, Rochester Lines, indorsed the position taken by Mr. Parsons and referred particularly to the need by the safety departments of sufficient funds and authority to carry on their work. Spasmodic effort or ill-advised propaganda, he said, is worse than useless, and while on large properties it is essential that accident prevention methods be supervised by some responsible person, every department and every individual must take an active part. The safety organization and meetings, however, do something more than result in accident reduction. By bringing employees and employers together in informal meetings, the old-time close relation between the two, which has been all but lost in these days of large companies and corporations, is brought back, and there is fostered a spirit of friendliness and helpfulness that is a tremendous asset to any public utility company. Organized safety also fosters a feeling of confidence in the management on the part of the public, as well as better public relations in the community in which the company operates.

The conference adjourned after a motion was made authorizing Mr. Barnes, the new chairman, to carry the message of safety to the claims officials at the Atlantic City convention and invite them to become members of the Electric Railway section of the National Safety Council. Mr. Truett, the retiring president, on behalf of himself and the other officers, thanked the section for the spirit of co-operation manifest during the year and commented upon the growth and importance of the Electric Railway section of the congress.

Unit Container and Demountable Body*

Conditions Are Outlined Favorable for Their Use—English Practice with Duralumin Containers Described—Advantages and Disadvantages of the Various Types of Containers Are Outlined

By F. C. Horner
Consulting Engineer General Motors Corporation, New York

UNIT containers, which can be loaded and sealed by the shipper, transported to the consignee on truck chassis, freight car, boat or all three without disturbing the contents, offer great possibilities in the co-ordination of all transportation facilities. The outstanding instances of unit container use in this country are to be found at Cincinnati, Ohio, and on the New York Central Railroad lines.

The demountable body in various forms is in use to a limited degree in many parts of the country and is probably more adaptable for general purposes of motor truck cartage than the unit container. In other words, the unit container is commonly referred to in connection with traffic interchange between rail and road vehicles, whereas the demountable body is more often used simply for interchange between motor truck and loading platform. In one sense a unit container is a demountable body when used with a motor truck, and a demountable body can easily be used on an ordinary flat car on rail movement. The container car, however, is one fitted to accommodate a definite size of container and is not used with any other equipment.

The best and latest type of unit container with which I am acquainted is constructed of duralumin. Its unladen weight is only two-fifths that of an oak container of equal capacity; that is, assuming the weight of an oak van as 1 ton, the duralumin van would weigh 800 lb. only. It is made in England, and besides the advantage gained in the reduction of weight, the manufacturers claim a great reduction in the cost of maintenance, though of course, that has yet to be proved. If actually subjected to load tests, duralumin vans would carry three times the loads of the wooden ones, but the main idea has been to combine lightness, strength and durability, the last two relating to the power of the container to resist impact blows against railway trucks, ship hatchways and docksides. Vickers duralumin has a tensile strength and hardness equal to good quality mild steel.

In discussing these duralumin containers with Mr. Griffiths, the manager of motor vehicles for Lyons & Company, London, the first firm to use them, I was told that after one year of service the maintenance and repair cost was practically nothing, whereas the cost of repairs to the wooden containers was very high.

The New York Central type of container was designed primarily as a unit that would fit a special flat car, but of a weight and size easily adaptable to the conventional motor truck chassis equipped either with or without a body. I believe the latest type has a capacity of 7,000 lb., the unladen weight being about 3,000 lb.

The container used by the Cincinnati Motor Terminals Company has a capacity of 4½ tons, and is of wood construction, with doors on both sides and both ends, and its unladen weight averages about 4,000 lb. For a time the Terminals Company and one of the electric railway companies entering Cincinnati conducted an interchange container service for the movement of l.c.l. freight. But the Cincinnati plan is essentially a motor truck movement for the transfer of trap-car freight between various rail terminals in what are quite commonly called demountable bodies.

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*Abstract of paper delivered before a gathering of electric railway executives at the office of E. J. Burdick, general manager Detroit United Railway, at Detroit, Mich., Sept. 13, 1923.

Other types of unit containers are:

1. Glass-lined tanks, such as are used on the New York Central lines and adaptable for milk and other liquids that can be shipped in bulk.
2. Containers for household goods, tobacco products, confectionery, and other commodities carrying a high tariff are in use in various parts of this country and Europe in a very limited way.

Referring to the demountable body, we have wider variety of types to choose from than with unit containers. The simplest and most adaptable type that I know of is an English invention. The London & Southwestern Railway, through the use of these bodies, increased the tonnage moved per day per motor truck almost 40 per cent within six months. Demountable bodies and flats are also used in England by Carter Patterson, the big express carriers, by the furniture and household goods movers, and in the cotton industry around Manchester. In the latter case the flats are often interchanged between rail and road vehicles. For protection from the weather, a sheet or tarpaulin tied over the bolts of cloth is all that is necessary.

In this country we have not developed this class of equipment to as great an extent as has been done in England. However, more and more thought is being given to the question of reducing delays in loading and unloading. The American Manufacturing Company and the L. K. Liggett Company are among the most prominent companies that have been using demountable bodies for some time and effecting real economies.

ADVANTAGES OF EACH TYPE

The principal advantage of the unit container adaptable to the rail and road vehicles in the transportation of goods is the saving in labor costs by reduction in handling operations. According to a paper presented before the Society of Terminal Engineers by F. S. Gallagher, engineer of rolling stock, New York Central lines, the individual package in less-than-carload freight customarily is handled at least thirteen times in passing from the shipper to the consignee, whereas, with the unit container, much of this handling is done in bulk.

Other advantages of the unit container are the saving from loss and damage to goods, and the saving that can be made on many classes of goods in crating and packing. This in turn permits of very material reduction in floor space required, which makes expansion of the business possible without further outlay in rental or property.

The advantages of the demountable body or flat over conventional fixed-on types are principally savings in time, and savings in floor and street space.

For instance, the motor truck chassis standing time can be reduced to a minimum by the scientific use of demountable equipment. The best demonstration of this can be seen at Cincinnati, where 225 bodies are used with only fifteen motor truck chassis. The voluntary standing time of these trucks for fifteen trips in eight hours is only about 15 per cent of the total, an excellent showing.

A very good example of the possible saving in floor space can also be found at Cincinnati. But the demountable flat equipment holds out the greatest possibilities from the standpoint of floor space economy, because it can be arranged so that the flat—or tray, as it is often called—forms a part of the platform itself. This can be accomplished by sliding the flat direct from the motor truck chassis into a pocket in the loading platform. To go further still, the flat can be rolled to any position on the floor, and if proper capacity elevators are available, to any position on any one of all floors in a building. This, of course, can also be done with unit containers, but both classes of equipment must be designed to fit prevailing conditions.

In short, where the goods can be moved in open bodies, the flat is by far the most adaptable and economical equipment that can be used for road transport work. Reduction in weight is also a big factor to consider when these hauling problems are analyzed. The flat, or tray, with a sheet or tarpaulin covering affords ample protection to goods hauled comparatively short distances; moreover, it is possible to collect and deliver those goods at store doors in a much more efficient manner than can be done with a closed-in container or box body.

Another type of equipment which may be called detachable rather than demountable is the tractor semi-trailer, or six wheeler. This equipment, which can be used to great advantage for many motor truck haulage operations, has come into quite common use in this country within the past few years. English road transport operators are also taking up this invention with great interest, and good results—only, however, within the past two years. But as the semi-trailer is not made for transfer between railway car and road tractor, I will not go into the subject further here.

Referring to bodies and flats, I think the motor truck owners have failed to realize all of the possibilities of this kind of equipment, largely because they usually conclude that overhead cranes or tackle of some kind is necessary at loading platforms, in order to make the operation really effective. They have evidently lost sight of the fact that with properly designed equipment wherever platform and chassis are about at the same level no overhead cranes or special equipment are required. Furthermore, the bed or flat can remain on the chassis for any length of time desired but is adaptable for rémoval where conditions permit. And now that we have found a way to transfer a flat or body from the ground to either truck chassis or flat car on rails, with the power derived from the motor truck engine, another disadvantage has been overcome.

But going back to the unit container used for interchange between electric and steam railways, and road vehicles, we have another story. I have discussed this subject at some length with both railway and road-transport men abroad as well as in America and my conclusions are that, without radical departure from present-day practice, it is only for special classes of traffic that the unit container can be used to advantage. Every railway man knows that one of the principal difficulties of operation is the unbalanced nature of the traffic, and in these circumstances alone the universal use of containers would be costly and uneconomic. If the flow of traffic, into and out of every town in the country was equal and balanced itself, they would be in quite general use in a short time.

Where a balanced bulk load traffic in both directions can be had, unit container equipment holds out great possibilities for saving in time and labor and thus a more economical movement than is possible by conventional methods. For instance, under a properly coordinated plan, a merchant with stores in several cities might use unit containers to great advantage. But, unless the containers can be loaded in both directions, the ultimate net saving will be very little and the venture may even turn out to be unprofitable, because the cost of transporting the empty is strictly waste effort. A container of light construction such as the duralumin one mentioned is therefore highly desirable from this as well as other standpoints.

Finally, I would caution all those concerned with transportation problems not to jump to conclusions about these matters. Each case where containers and demountable bodies may be used should be carefully analyzed from every angle, because almost every case is a special one, involving perhaps complications that do not appear on the surface but that can be satisfactorily solved through close study by transportation experts.

Meeting of Management Association

THE second annual meeting of the American Management Association at the Hotel Astor, New York City, Oct. 29-30-31, which will be devoted to the problem of human relations in commerce and industry, promises to be notable both in program and in attendence. Owen D. Young of the General Electric Company, is chairman of the general convention committee, and Martin Dodge, manager of the Industrial Bureau of the Merchants' Association, is secretary.

Among the topics to be discussed in the three-day session are economics for employees, job description and man specifications, labor-saving office equipment, distributing and utilizing the product of the public schools, selection of supervisory forces, scope and management of medical departments and use of motion pictures in personnel work. At the annual dinner on Oct. 30 "Stabilizing Prosperity in America" is the topic.

New England Street Railway Club to Meet Oct. 25

THE first of the season's meetings of the New England Street Railway Club will be held in the Swiss Room of the Copley Plaza Hotel, Boston, Mass., on Thursday, Oct. 25.

The afternoon meeting, called for 4 p.m., will be devoted to a series of fifteen-minute papers on the following subjects:

"The Lightweight Car," by J. C. Thirlwall, General Electric Company; "Air Brakes—Safety Devices as Applied to Light-Weight Cars," by E. W. Davis, Westinghouse Traction Brake Company; "Car Body Types as Applied to Light-Weight Cars," by Charles F. Johnson, the J. G. Brill Company; "Automatic Substation Equipment," by J. P. Alexander, Westinghouse Electric & Manufacturing Company; "Joints—Seam and Surface Welding," by C. H. Wood, C. N. Wood Company.

At the evening meeting a number of reports, with discussion, will be given upon vital matters developed at the A.E.R.A. convention, as follows:

"General Operation and Allied Matters," by Edward Dana, Boston Elevated Railway; "Cars and Equipment," by W. C. Bolt, Eastern Massachusetts Street Railway; "Track—New Appliances and Practice," by H. M. Steward, Boston Elevated Railway; "Safety Work," by Fred A. Cummings, Eastern Massachusetts Street Railway.

American Association News

The Association's Program for 1923-24

THE committee on subjects and meetings met at Atlantic City with Chairman J. N. Shannahan presiding, and drafted the following report, which was submitted to the incoming executive committee of the American Association at its first meeting:

The committee recommends that the association devote itself primarily during the coming year to a continuing study of the broad subject of the relation of the industry to the public on one hand and to the government on the other. To carry out these subjects the following special committees are recommended.

There has been an effort in certain quarters to depreciate the value and utility of the electric railway. A definite program of work should be pursued to offset this propaganda and to stimulate electric railway companies in the development and utilization of modern equipment and facilities and methods. To carry out this work practically, it is suggested that two committees be organized—one on city operation and the other on interurban operation. The presentations which have been made under the Charles A. Coffin Award by a group of seventeen companies are ample evidence of the progressive spirit of the industry.

COMMITTEE ON PUBLICITY

This committee should continue to co-operate with the committee of one hundred and with the special committee of manufacturers, and direct and advise the advertising section of the headquarters organization in conducting the general publicity program. Particular attention is called to the need for more public speaking by executives of member companies, both railway and manufacturers, and it is suggested that the committee promote work along these lines during the current year. One method by which this can be accomplished is through encouraging the closest possible co-operation between the headquarters organization and the various state committees on public utility information and the work which the latter are doing in securing public speakers in their local districts.

It is recommended that a special committee be appointed to study the subject of regulation as it exists in the various states, and to ascertain whether it is not feasible to prepare a general outline of the principles which should underly the regulatory laws controlling the industry in the various states. The purpose of this study is to secure if possible a greater degree of uniformity in both the control and regulation of all phases of the transportation industry, as well as to provide greater protection against unjust competition. This committee should co-operate with similar committees of the other utility associations in considering a possible uniform public utility law.

COMMITTEE ON SPECIAL TAXES

This committee should be continued. The report this year set forth very clearly the elements of special taxes and other imposts levied upon electric railways. The next work of this committee should be to indicate the lines along which efforts should be directed to secure relief from such tax burdens.

It is also recommended that this committee investigate and report on the factors which electric railway companies should properly take into consideration in endeavoring to secure relief from the excess profits tax, which has been improperly placed upon companies in certain instances. This should cover a consideration of the rulings of the Income Tax Bureau regarding depreciation accounting on ways and structures and the question of entering up depreciation appropriations by electric railways under a ruling similar to that allowed in the case of national banks. It is further suggested that this committee study and report upon the general question of a taxation program for highways, particularly with reference to the correlation of taxes for this purpose with taxation of other transportation agencies. It is also suggested that this committee co-operate with the committee on national relations when any of these matters require a presentation to be made before a governmental body.

COMMITTEE ON VALUATION

It is recommended that this committee be continued. It should give further study to the question of the proper basis for valuations, with particular reference to the original cost basis and the reproduction cost basis. The committee should review current decisions of both courts and commissions for the purpose of following the trend, in view of the developments which are taking place in the legal interpretation of this subject.

The committee on education should be continued. It should give special consideration to the development of co-operative courses, both in electric railway operation as well as in electric railway economics with colleges, universities and technical schools. The extension departments of these institutions in many cases are in a position to conduct such courses for street railway employees. The committee should continue the work in this direction which was started by this year's committee.

It is recommended that the committee on insurance be continued and that it carry on the work of investigating the rates charged electric railway companies with a view to ascertaining whether a reduction cannot be secured. The committee may also consider such recommendations to member companies as will insure greater fire protection.

TRACKLESS TRANSPORTATION

The policy of the association with respect to the co-ordination of transportation service in each community has been well defined in the last two years. It is believed that the association may this year leave the matter in the hands of its affiliated associations with the recommendation that they study and report upon it from their respective operating standpoints.

It is recommended that a special committee be appointed to study the use of subways and elevated railways for city traffic.

It is recommended that a new committee be formed to study the elements of indeterminate franchises. It is generally believed that these have advantages over the usual fixed term franchise and all such facts should be considered in the report and recommendations of the committee.

It is recommended that a new committee on unification and co-ordination of all forms of local transportation be formed to consider the economics of transportation with respect to the needs of the community as a whole, having in mind both the electric railway and the motor bus. It should consider the economies to be effected by organizing all transportation facilities under one management.

The News of the Industry

High-Speed Electric Line to Atlantic City Does Well

It is reported that the proposed lease of the West Jersey & Seashore Railroad by the Pennsylvania Railroad may be effected on a 5 per cent dividend basis after the declaration of a 25 per cent stock dividend. The committee representing the West Jersey's shareholders is understood to desire a 30 per cent dividend, while the Pennsylvania Railroad's representatives are of opinion that a 20 per cent stock dividend will cover the amount of earnings placed back in the property over a period of years.

The estimated property value of the West Jersey & Seashore Railroad, which operates a line from Camden to Atlantic City and Cape May, with several branches, 69 miles of which are operated electrically, is $31,000,000. Its funded debt is $7,000,000 first consolidated sinking fund 3½s and 4s, due July 1, 1936, of which $5,767,000 are outstanding, and $24,816 equipment trust obligations.

It has authorized $13,000,000 of $50 par value common stock and $104 000 special guaranteed $50 par value stock. There is outstanding $11,586,250 of the common stock and $88,400 special stock. The Pennsylvania Railroad owns $6.747,900 of the common stock and $45,350 of the special stock.

With the exception of 1906-07, when 6 per cent was paid, dividends on West Jersey common have never run higher than 5 per cent since 1896. Earnings on the issue, however, have gone as high as 11 per cent or more, the greater part of which was placed back in the property, thus enhancing the property value.

The road's earnings this year, based on reports published for the eight months ended Aug. 31, are expected to run above 12 per cent.

Republicans of New York Attack Governor Smith's Municipal Ownership Program

Formal announcement has been made through the Republican State Chairman of New York of the campaign plans to retain control of the 1924 Assembly. Theodore Roosevelt, assistant secretary of the navy; United States Senator James W. Wadsworth, Jr.; former State Senator Nathaniel A. Elsberg, and Speaker Machold will all camp on the trail of Governor Smith, who is calling upon the voters for a democratic Assembly so that his policies may be enacted. In opening in campaign for the democrats more than a week ago in Rochester the Governor assailed what he described as the policy of the Republican legislative leaders to hamstring his legislative program.

State Chairman Morris, in disclosing plans for the Republican campaign fight, assailed what he described as Tammany's efforts to seize the machinery of state government. He said:

> One would think that Governor Smith, who is supposed to know something about business, would go slow on the subject of municipal operation. The Republicans hold fast to the principle of state regulation of public utilities. The political history of the state shows that it was the Republicans long ago, under Governor Hughes, who stopped the corrupt bargaining between Tammany and the public service corporations. Tammany this year at Albany obstinately clung to its determination to have municipal ownership and operation and complete control of contract letting. With one it would supply an army of employees. With the other it would enrich its leaders.

Convention Party Returns by Motor Bus

For those who were fortunate enough to participate in it, an interesting and novel finish to the convention of the American Electric Railway Association was the trip from Atlantic City to New York City in the "Corinne," one of the six Safety Coaches exhibited by Frank R. Fageol, Oakland, Cal. This parlor car-observation coach, which is to be turned over to the Chicago, North Shore & Milwaukee Railroad on its arrival in Chicago, started from the Marlborough-Blenheim Friday, Oct. 12, with all seats taken but two. Mr. and Mrs. Fageol, who were aboard, had as their guests Mr. and Mrs. Robert B. Stearns, Boston; Mr. and Mrs. Edward Dana, Boston; Mr. and Mrs. W. E. Jones, Providence; Mr. and Mrs. S. H. Anderson, Los Angeles; Mrs. M. A. Philo, New York City; Mr. Claus Spreckels, Coronado; M. McCants, San Francisco; R. C. Smith, Los Angeles; J. H. Handlon, San Francisco; J. M. Yount, San Francisco; V. E. Keenan, Providence; Douglas W. Dodge, San Francisco; J. B. Daly, New York.

A stop was made at Biggett's—somewhere in New Jersey—for luncheon, and while it was being prepared Claus Spreckels was persuaded to play the piano and sing a few operatic selections. There was also dancing, at which J. H. Handlon proved to be a near rival of Nijinsky, and J. M. Yount at least an understudy for Maurice.

As the "Corinne" neared New York wagers were made on the miles traveled, on length of time it would take from the ferry to the Commodore, on the exact minute the coach would draw up in front of the hotel and come to a stop and on several other risks. Altogether it was a thoroughly delightful trip.

High-Speed Operation Out of Boston

A rapid transit line approximately 8 miles long from Harvard Square to Peabody Square, Dorchester, is assured by the decision of the trustees of the Boston Elevated Railway to revise plans for the absorption of the Shawmut branch and its incorporation in the Elevated system and run Dorchester Tunnel trains to Ashmont.

The Legislative act, authorizing the city of Boston to buy the Shawmut branch and lease it to the Boston Elevated Railway made no specific provision for service beyond Welles Avenue, save to decree that the Elevated must guarantee adequate service for the people of Milton. Originally, the Elevated had merely announced extension of the Dorchester Tunnel train service from Andrews Square to Fields Corner, with single-car service to Milton.

The Legislature, however, left the Boston Elevated Railway wide latitude in working out plans for service beyond Fields Corner, and the trustees have decided that for reasonable expenditure the rapid transit service can be extended to Peabody Square. Mayor Curley has urged that this be done.

The plans of the Elevated call for the depression of the Shawmut branch roadbed to eliminate five grade crossings. Elevated trains will run over the right-of-way of the Boston Division of the New Haven Road, paralleling the railroad tracks. beyond Andrew Square where the Shawmut branch begins.

Plan to Utilize Railroad as Part of City System Impracticable

The Committee of One Hundred has been told by George Le Boutillier, now president of the Long Island Railroad, that its program for improved transit service within the city limits of New York would cost about $250,000,000 and that it is impracticable in other respects. The committee has been working with the members of the Transit Committee of the Brooklyn Chamber of Commerce. Mr. Le Boutillier says that entirely aside from the economic impracticability of any such intracity development as is proposed, and the impossibility of securing charter and franchise rights, it would be futile for the Long Island Railroad to attempt to transform its railroad into a combination of a city rapid transit system and a non-rapid transit system, caring for suburban and long-distance passengers and the transportation of freight. The two kinds of business are fundamentally different. The facilities to serve them cannot be combined.

Boston "L" Wages Advanced Nine Cents

Arbitration Board Award Retroactive to July 1 Will Cost Company $2,000,000 a Year—Request for Shorter Work Day on Sunday and Holidays Denied

An increase of 9 cents an hour over the present wages has been awarded to trainmen of the Boston Elevated Railway. This is the decision of the board of arbitration handed down on Oct. 15. The opinion of the board is that the circumstances justify a return to the rate fixed by the Doherty award of 1920. In consequence the maximum rate fixed for motormen and conductors of two-men surface cars is 70 cents an hour for an eight-hour day.

As for the differential above the rate of wages awarded to motormen and conductors of surface lines to be paid to operators of one-man cars and buses, the board has decided that it shall remain at the present rate of 8 cents an hour. On the request for a shorter work day on Sundays and holidays, the board has answered in the negative. The belief is expressed, however, that this matter should be the subject of further negotiations between the company and the men for the purpose of seeing if the desired object cannot be accomplished by the men making some concession and assuming at least a part of the burden. The board says it became evident at the hearing that the management of the road was in sympathy with the desire of the men for a shorter work-day on Sunday, but was prevented from granting it only because of the great expense it would throw upon the company.

The award is retroactive to July 1, 1923, and continues in force until July 1, 1924. The back pay is to be paid by the company by Dec. 15. Any questions that arise between the parties as to the meaning of any of the provisions of the award are to be referred to the board for determination. The rates established by the award are carried out through all the grades and classes of employment.

STILL GREATER CO-OPERATION NECESSARY

Edward Dana, general manager of the Elevated, made the following statement concerning the award:

> The arbitration award means an increase in operating costs on the basis of present service and operating conditions in the vicinity of $2,000,000 annually.
>
> The estimated balance above the cost of service for the year ended June 30, 1924, amounted to $1 278,000 on the basis of existing wage rates, which amount would have been available for repayment to cities and towns.
>
> The award therefore means that, if present conditions are continued, such a repayment is prevented and the excess of several hundred thousand dollars must be met.
>
> This calls for large efforts, but the trustees will face the coming year in the belief that the members of the organization benefited by the award will do all in their power through increased efficiency and co-operation to meet the conditions imposed, and that by united efforts of men and management it may be possible to do so.

Although the arbitration agreement submitted five questions for decision, it became unnecessary to consider the fourth and fifth, and the first three only are dealt with in the report.

The first question was: "What rates of wages shall be paid to all of the employees of the company who are members of the Association?"

The parties agreed that in dealing with this question, the arbitrators needed only to determine the maximum basic wage to be paid to motormen and conductors of the two-men surface cars; and that when this was determined in the form of cents per hour, the parties themselves would be able, according to a rule of percentage or addition which they have adopted, to determine all the other rates of wages involved in the arbitration. The board adopted this suggestion.

MEN ASKED THIRTY-CENT INCREASE

The maximum basic wage of motormen and conductors of two-men surface cars has been 61 cents an hour, for an eight-hour work day. This is not the highest rate the company has ever paid. From May 1, 1920, to June 30, 1921, the rate fixed by a majority of a board of arbitrators of which the late James L. Doherty was chairman, was 70 cents an hour. It was gradually reduced to the present rate by voluntary agreement between the company and union.

The men asked that this wage be increased 30 cents, or to a total of 91 cents an hour. In support of their claim they urged that the present trend of wages throughout the country was upward; that costs of living which fell off during the period of business depression were again advancing; that reasonable standards of living for laboring men were higher than they have ever been before; that the maintenance of this higher standard was wise as well as just; that they asked no more than others were receiving in comparable employments; and that the outlook for improved financial conditions justified their demand for more generous treatment.

The company, on the other hand, denied that the increase demanded by the men was reasonable or practicable. In support of its contention, the company urged that wages had more than kept pace with the increased cost of living; that the reductions of wages since 1920 had been proportionately much less than the falling off in living cost; that in many comparable occupations the wages paid were lower than these men are now receiving; that little dependence was to be put on theoretical budgets prepared to show cost of living; and that any large increase in the present wages would tend to throw an unfair burden upon those who ride on the cars and upon tax payers who, under the present law, must make up any deficit that results from the operation of the road.

The board said that both views were urged with great force and skill by the arbitrators who represented the company and the men, and there was so much of truth in each contention, that it was no easy task to find their proper resultant. The board said:

> It would probably be unfortunate for all concerned if we adopted a standard of wages that would necessitate an increase of fares beyond the present 10-cent rate. It is not believed that the increase granted in this award will have that result. On the other hand, there seems to be little justice in demanding an immediate return to old prices for transportation when every other product of human industry has increased in price. It seems clear also that the fixing of wages on a fair and somewhat permanent basis ought to precede, rather than follow, reductions in fares, in order that all the elements of the problem may be known when reductions are under consideration.
>
> One would be blind to the obvious tendencies of recent times, if he did not observe the marked disposition to treat labor with greater liberality. Labor is no longer regarded as a mere commodity, to be bought at the lowest competitive price. The old idea of an irrepressible conflict between labor and capital is losing its prestige, and giving way to more enlightened thought. It is to be hoped that the earnest study of economists may ultimately provide us with a rule that will settle all difficulties. Today every step that promotes harmony rather than discord, that encourages co-operation, that substitutes arbitration for the strike, ought to be met in a liberal spirit. Especially is this so when the employer is a public or quasi-public body.
>
> We wish to make it clear that the decision we have reached is not governed by any rule that requires a wage adjustment to meet a mere increase in the cost of living. In the opinion of a majority of the board such a rule would not justify the increase granted. It would be a misinterpretation of this decision, to attempt hereafter to say that the scale should move up or down according as the percentage of living cost should rise or fall. We have taken into consideration not merely the *cost*, but also the *standard* of living.
>
> The things that have had especial weight in this decision are (1) the scales of wages now paid by public bodies in comparable employments, such, for example, as police and fire departments, (2) the wages paid in comparable private occupations, particularly the building trades, (3) the most reliable studies of family budgets regarded by economists as tending to fix what is known as the American Standard of Living, and (4) the wages fixed for certain street railways in two of the largest cities in the country, Chicago and New York.

The chairman was of the opinion that in those cases where the operator must collect the fares, make change and issue transfers, the present differential of 8 cents an hour was inadequate; but both sides agreed that it would not be practicable to have two separate rates for one-man cars. It was testified that at the present time about 25 per cent of the runs was made by one-man cars, but in 80 per cent of the one-man car traffic, collection of fares on the car was not required. In view principally of the fact that the one-man car operator was given, in common with other car men, the increase of 9 cents an hour granted by the award, it did not seem to the board that it would be justified in raising the differential as to all the operators of one-man cars on the line.

Charles W. Mulcahy, for the company, joined in signing the award as he agreed with the decision of the second and third questions submitted to the board, namely, the differential to be paid to operators of one-man cars and the hours of labor on Sundays and holidays, but he dissented from the decision of the first question granting the increase in rates of wages.

Want Service-at-Cost Amended in Toledo

Initial steps toward amending the Milner service-at-cost plan of electric railway operation at Toledo have been taken by the City Council. At a recent meeting a motion appointing a committee to confer with the city law director and the Doherty interests was passed. Councilman Emch, who fathered the idea, said the principal point to be considered was the increase in depreciation fund from 1½ per cent maximum limit to 5 or 5½ per cent of the invested capital, as suggested by Commissioner W. E. Cann. Mr. Emch would also establish a surplus fund from which minor improvements and additions could be financed instead of by means of additional 8 per cent preferred stock.

At the present time the depreciation fund is one in name only, setting up merely enough to cover a few changes, track removals, and such work. Maintenance funds are more elastic and cover a portion of the field usually allotted to depreciation.

It is doubtful whether much can be done to change the ordinance as the original intention of the business men who framed it was to provide for new capital through the issuance of preferred stock and not make a direct charge upon the car riders.

Texas Interurban Restrained Permanently

The Texas Interurban Company of Dallas has lost its fight in court against an injunction restraining the company from constructing tracks on Fairmount Avenue over which the connection with the Missouri, Kansas & Texas Railway is to be electrified between Dallas and Denton. A temporary injunction against the company, preventing it from laying tracks on Fairmount Avenue, was granted by Judge Louis Wilson several months ago, after the city of Dallas had granted a franchise authorizing the company to build the line on Fairmount Avenue.

The recent hearing before Judge Wilson was on a motion by the Texas Interurban Company, which will build the electrified Katy line to Denton, for dissolution of the temporary injunction. Judge Wilson declined to dissolve the injunction, but issued an order making it permanent. The interurban company gave notice of appeal, and in the meantime all work on the project of electrifying the Katy is being delayed pending final settlement of this controversy.

Since it appears probable that the interurban company will be permanently enjoined from building its line on Fairmount Avenue, it may be necessary to select some other route for the Denton interurban cars to enter the city. In this connection, W. M. Whitenton, in charge of operations of the Missouri, Kansas & Texas in Texas, announces that it would be agreeable for the interurban company to use the tracks of the Katy into the city. Although the newly proposed line of entry may not be regarded as favorably as the Fairmount Avenue, because it would not serve a district of the city now without street car facilities, this entry into the city could be made with far less expenditure than the proposed Fairmount Avenue line.

Working Out Details for Elimination of Grade Crossings in Los Angeles

In view of the many grade crossing accidents in Los Angeles County during the past eighteen months committees recently appointed by the California Railroad Commission, county engineers and engineers from city governments, together with officials and engineers of steam and electric railroads, have met to evolve plans for the separation and elimination of grade crossings in Los Angeles city and county.

It was found that cost of elimination would be from $25,000 to $250,000, but in a majority of cases the general average would be approximately $50,000 per grade crossing. It was pointed out that to the rapid real estate development in southern California there is attributed much of the evil of the grade crossing, whereas the Pacific Electric representatives cited figures to show at present the interurban company has 1,200 grade crossings with highways on its lines.

It is viewed that the cost of eliminating the grade crossings and the proportion thereof is to be borne by the railway companies, the state, the county of Los Angeles, the city of Los Angeles or the interested property owner involved. Methods of financing the cost of the proposed improvements are to to considered. The lessening of the cost of maintaining the crossing, the element of time saved by the railroads and the saving of outlay for damages, together with numerous other factors, would be used in determining the amount the railway companies should pay for the improvements. In the event there is a deadlock in determining the method of allocating the grade crossing elimination expense, it is left with the State Railroad Commission, as the governing body, to establish an equitable manner for proportioning the expense among all involved.

In order to determine the most dangerous grade crossings that should be eliminated each steam and electric line operating in Los Angeles County was requested to furnish a list of grade crossings that it maintains in the county, suggesting the five grade crossings which, in its judgment, are the most hazardous to the company itself and to vehicular traffic.

On Aug. 31 the full committee met and reviewed the list of twenty-three of the most dangerous grade crossings in Los Angeles and vicinity, specified by five railroads, whereby immediate steps are to be taken toward the elimination of ten of these.

South Jacksonville Knew What It Wanted, Then Went After It

The residents of South Jacksonville, Fla., have had the following puzzle to solve: "If a city is too small to support a street car company, and if it cannot grow unless it has the street cars, how can it get them?" The answer, as they see it, is to sell $100,000 of city bonds, buy four cars, have an experienced construction firm lay the tracks, and arrange for the company in the adjoining city to operate the cars economically.

South Jacksonville, just across the St. Johns River from Jacksonville, has 5,000 inhabitants, lots of ambition and a new county bridge across the river to its big sister city. When the bridge was built car tracks were included, in the hope that some day they would be used, but a study by E. J. Triay, receiver of the Jacksonville Traction Company, proved that an extension of track and service into South Jacksonville would at first be a money-losing proposition.

So the business men and officials got to work, sold $100,000 of municipal bonds voted for the purpose and were ready to buy what they needed—a street car system which they expect will bring profit to them and their city through increased population, higher property values and greater general activity.

An unusual feature of the plan is that although the new line will be municipally owned it will not be municipally built or operated. The construction contract has been placed with Stone & Webster, Inc., of Boston, and another contract has been signed with E. J. Triay, receiver of the Jacksonville Traction Company, to operate the cars and charge the city on a mileage basis. The negotiations to this end were referred to in the ELECTRIC RAILWAY JOURNAL for May 19, page 859.

Wages Advanced.—The Quincy Street Railway recently announced a pay increase effective Oct. 1. Under the plan new conductors and motormen will receive an increase of from 37½ cents to 40 cents an hour. Old conductors and motormen, with three years' service and over, a short time ago received a raise of from 42½ cents to 45 cents.

Will Seek Paving Relief.—The Legislature of Iowa will be asked to eliminate the paving tax on electric railway lines and to provide that the cost of paving fall on the property owners abutting or that it be paid out of a general fund, according to information from Davenport. This bill will be backed by all the street car companies in Iowa and will also have the backing of the general utility interests. The street car operators claim that the paving tax is now one of the big burdens which is steadily tending to break their financial backs. In Davenport, for instance, the Tri-City Railway claims that of every 8 cents which it receives in fares 1 cent must go to pay for paving or for the interest on depreciation of paving.

New Location for McGraw-Hill Company of California

The offices of the McGraw-Hill Company of California in San Francisco will be moved on Nov. 1 to a new location in the Mohr Building, 883 Mission Street.

Competitive Five-Cent Fare a Failure

Uzal H. McCarter, a director of the Public Service Corporation of New Jersey, in a speech made on Oct. 16 said the 5-cent fare being charged for an experimental period on the local lines of the railway in the principal communities is a flat failure. He said the 5-cent fare with the railway and jitney service co-ordinated is the proper rate and would solve the transportation problem. Service has been fully restored by the railway since the strike, but the loss to the railway represented by the falling off in patronage over the pre-strike period is $10,000 a day. Mr. McCarter charges the present transportation difficulties to the failure of the city and state officials to enforce the laws regarding the operation of buses. He was afraid that the efforts at enforcement now being made would take too long to carry out.

John L. O'Toole, vice-president, speaking for the railway, said that the company was not ready to make public the figures regarding the new fare, which has been in force only since Oct. 1.

Commission Given New Power. — Governor Brandon of Alabama, recently approved a bill giving authority over utilities engaged in interstate commerce to the Alabama Public Service Commission. The commission had previously had jurisdiction only over utilities engaged in intrastate commerce.

Japanese Studying Transit Conditions.—Mitsuru Ishii, chief secretary, Municipal Electric Bureau of Tokyo, and K. Murakoshi, assistant secretary of the Japanese Government Railways, are studying the transit conditions in various cities throughout the United States and are looking into the field of motor transportation.

Votes Against Extension.—The public utilities committee of the Board of Supervisors of San Francisco recently voted down a resolution to prepare plans and specifications for the construction of a proposed extension of the Municipal Railways from Cole and Carl to the beach. A number of residents of the Sunset district were on hand to request the building of the new line.

Offices Moved.—The general offices of the receiver of the Long Island & Queens County Railways have been removed from 7-9 Borden Avenue, Long Island City, to 36 Twenty-fifth Street, Jackson Heights, Long Island. The offices of the New York & Queens County Railway also do the accounting and auditing of the Long Island Electric Railway and the New York & Long Island Traction Company.

Colonel Perkins Elected Officer of Veterans Body.—Col. Albert T. Perkins, manager of the United Railways Company, St. Louis, was elected junior vice-commander of the Military Order of the World War Veterans at the annual convention held in Washington, D. C., recently. During the war Colonel Perkins served as director of light combat railways for the army in the San Mihiel sector.

"Partners" Expands. — "Partners" now carries the monogram of the Texas Interurban Railway at its head, along with that of the Dallas Railway. Effective with the Sept. 20 issue, the Texas Interurban Company became associated with the Dallas property in the publication of this pamphlet. The editor of "Partners" is anxious to get news from the Interurban and has asked that the dispatchers serve as editors for this department.

Agree on Joint Arbitration.—Track employees of the Chicago Surface Lines returned to work on Oct. 8 after being on strike since Sept. 12. The men had insisted that the company agree to arbitrate with limitations which would have compared them with building laborers instead of track laborers. They finally agreed to the company's terms, namely, to go into the joint arbitration with the other unions without any limitations. The arbitration proceedings will start on Oct. 22 covering the various trades working in the shops and wreck wagons as well as the track men. About 1,200 track laborers were involved in the strike, which did not affect the company's service.

Company Wins Niles Fight.—Judge Cole sitting in Warren on Oct. 3 made permanent the temporary injunction restraining the city of Niles from further removing the tracks and held the Pennsylvania-Ohio had authority to relay the rails torn up at Cherry Street and at the switch in Robbins Avenue. In less than twelve hours after the decision had been given track gangs had repaired the tracks and through service was being given. In rendering the decision Judge Cole recommended that both parties take their fight before the Public Utilities Commission. The controversy between the city of Niles and the Pennsylvania-Ohio Electric Company began several months ago when the company refused to pay for repaving of Robbins Avenue, which according to the Niles officials it had contracted to do.

"Transportation News" Makes Début.—In order that employees of the New York State Railways may become better acquainted with one another and that each may know what the other is doing, the company has started the publication of "Transportation News." The first issue, under date of August, 1923, has been dedicated as a token of respect and esteem to James F. Hamilton, president. Hereafter the book will appear every month. In the first issue, Mr. Hamilton, in introducing the publication, says that he hopes in the pages answers will be found to questions that have been in the employees' minds, and that they will find subjects of interest in the magazine. The editor of the paper is A. W. Koehler, who is the director of safety of the New York State Railways.

Car Problem Subject of the Hour.—Interest is keen throughout Anderson, S. C., looking toward a solution of the car problem in that city. President Sullivan of the Chamber of Commerce has named a committee to discuss the car situation with the City Council. Manager H. A. Orr of the Southern Public Utilities Company, which operates the electric railway system in Anderson, was recently in receipt of a letter from James N. Pearman, a member of the South Carolina Railroad Commission, in which Mr. Pearman commended the manager of the company for taking up the matter with the citizens. He also expressed the hope that some arrangement could be made which would continue the service for the people of the city.

Has Adopted Bonus Plan.—The quarterly bonus plan which has been in operation for the past two years by the Wisconsin Public Service Corporation, Green Bay, has been adopted by the Menominee & Marinette Light & Traction Company. The plan to institute this policy in Marinette was made following the return of Green Bay trainmen who attended the safety meetings. The Green Bay bonus plan, which has attracted state-wide as well as nation-wide attention, is a constructive effort to secure "safety, courtesy and service" for the traveling public. Mother's Day is celebrated as "Dress Up Day" in Green Bay and theoretically the quarterly bonus, the additional individual bonus for D credits and the annual bonus permit each employee to purchase a new uniform for the amount that he can save through the regular daily practice of safety, courtesy and service to the street car riding public.

Reports on Santa Fé Electrification.—A survey of hydro-electric possibilities on the Colorado River has recently been undertaken and completed by engineers of the Santa Fé System. The study was made with a view of determining whether it is feasible to electrify the trans-continental lines in that section of the desert country on the Pacific Coast as traversed by the Santa Fé System. These facts were brought out recently in an address by W. B. Storey, president of the Santa Fé Lines, before the Chamber of Commerce at Pasadena. Mr. Storey said that the officials of the Santa Fé had been following the progress of the Chicago, Milwaukee & St. Paul Railroad in electrification of its northern lines with perhaps more interest than any other road. He stated that his company had limited resources for hydro-electric power, which meant cheap power, but that his engineers had completed a survey of the possibilities in that direction on the Colorado River, and while there were no definite plans at this moment concerning electrification, the question might come up in the near future.

Foreign News

Increased Fares May Continue in Britain

There are in existence two post-war emergency acts of Parliament permitting tramway undertakings in Great Britain to charge higher fares than the previous statutory maximum of a penny a mile. These are the statutory undertakings (temporary increase of charges) act, 1918, and the tramways (temporary increase of charges) act, 1920, and they expire on Dec. 31, 1924. The Ministry of Transport has, however, intimated that it is the intention of the government to include the former act so far as it relates to tramways and also the latter act in that schedule of the expiring laws continuance bill of 1924. This will have the effect of continuing the operation of the two acts for another year. When the time comes, should the course appear desirable, the government will be prepared favorably to consider the inclusion of the two acts also in the expiring laws continuance bill of 1925.

Tramcar vs. Bus in England

H. Mattison, general maanger of the Manchester Corporation Tramways, has presented to the tramways committee of the city a long report on the respective merits of the tramcar, the petrol bus and the trackless trolley bus, more especially in the conditions prevailing in large cities. The conclusions at which he arrives are to the following effect:

1. The motor bus is the best and most economical vehicle for any service not requiring a greater frequency than four vehicles per hour, operating on the basis of fares of three quarters of a mile for 1d.

2. The trackless trolley bus is the most economical for services of from four to six vehicles per hour, carrying seventeen passengers per mile at a fare of 1d. per mile and operating sixteen hours per day.

3. The tramcar is undoubtedly the most generally satisfactory vehicle for services of six or more cars per hour and when it can operate for eighteen hours per day, carrying an average load of twenty-five passengers per mile, and at fares based on 1 mile for 1d.

The tramways committee, after considering the report, stated that it was satisfied that the policy hitherto pursued had been fully vindicated. That policy has been to develop to the fullest extent the tramway system of the city and surrounding districts and to utilize the motor bus as a feeder to the tramways. Terminals already established will reduce the tramway traffic in the central area. In the opinion of the committee the motor bus cannot be considered either as a practical or financial substitute for the tramcar for passenger transportation either for the city and districts or for the central area only.

The City Council has approved these reports.

Accidents in London Streets

A return issued by the London Metropolitan Police shows that during the three months April, May and June of this year no fewer than 171 persons were killed in street accidents in London, and the total number of accidents was 18,028. The following table shows the details in regard to each kind of vehicle concerned:

Type of Vehicle	Persons Killed	Accidents
Mechanically propelled:		
Omnibuses	18	1,391
Tramcars	6	1,086
Cabs	5	1,001
Private motor cars	51	4,445
Motorcyclcs	13	1,638
Trade and commercial	60	3,391
Traction engines	...	10
Horse drawn:		
Omnibuses	...	1
Cabs	...	15
Broughams	...	66
Trade and commercial	10	2,159
Pedal cycles	7	2,784
Horses ridden or lead	1	41
Totals	171	18,028

Style in Station Buildings

The London Electric Railway is doing everything possible in connection with its rural extension line now under construction from Golden's Green to Edgware not only to secure efficiency but to minister to the comfort and the taste of the public. In the latter direction an example is found in Brent Station, the first one on the extension, which is approaching completion. It is designed in Georgian style and will harmonize well with its rural surroundings. Approached by a broad macadam forecourt, the station consists primarily of a booking hall 50 ft. square, entrance being effected through a Portland stone portico formed of coupled Doric columns. A touch of color will be given by the use of sand-faced bricks of varying tones of red and purple which will contrast pleasantly with the white stone of the portico. The roof is covered with Italian tiles and has wide projecting eaves. The booking hall floor is covered with large black and white non-slip tiles, and the walls are also tiled out in panels to provide neat spaces for advertisements, thus preventing the disfigurement of the station by the haphazard posting of bills.

The platforms being about 15 ft. above the level of the roadway, the trains are approached from the station through a short subway under the viaduct and then up a flight of stairs on to the platforms.

The booking hall will be equipped with three of the latest pattern passimeter booking booths constructed in oak and harmonizing with the booking hall.

Consolidated Paris Surface Car Lines Are Improving Their Facilities

What is known as the "Transports in Common of the Paris District" has combined all surface lines of passenger transport and the flyboats on the Seine between the stations above Paris to those just below the fortifications. The last two privately owned surface lines to be absorbed are the Bois de Boulogne Railway and the Paris-Arpajon Suburban Railway. In conformity with a decree of July 8, 1922, and another of Nov. 20, 1922, this brings all passenger transport within the Paris limits and that of the Department of the Seine under one general control.

By an intensive utilization of rolling stock the traffic has developed considerably during the past fiscal year. Passengers carried were 917,723,233, an increase of 5.1 per cent as compared with 1921 and receipts were superior to the extent of 10.8 per cent, reaching the figure of 297,128,574 francs.

Operating expenses are being reduced where possible by an increased car-kilometrage and the best possible utilization of the traveling personnel, which is not to say that wages are likely to be reduced or the force reduced in numbers, simply a more efficient application of man and car power being called for.

During the past year car lines starting from central points in Paris have been greatly modified as to their itineraries and in many cases prolonged to the fortifications and in some cases beyond, whereas formerly they stopped at the octroi barriers. Upkeep and construction have kept pace with the new demands, under control of government inspectors. A new program of amelioration and extension is in progress which will call for the expenditure of 367,000,000 francs, of which 100,000,000 francs is already engaged.

Track has been put into good condition over 147 km. of trolley overhead lines and there have been laid 3.4 km. of track with underground electrical contact with 13 km. of new overhead trolley constructed.

During the past year there were built forty-one motor cars, 100 trailers, sixty-two motor buses of four wheels and fifty auto buses of six wheels. A new and lighter electric motor has been adopted which permits an economy of electrical energy and 250 cars of this type have been ordered.

The flyboats on the Seine, which were taken over during the war from a company which had been in existence many years, number thirty-four as having been reconditioned, with eight others ultimately to be put in service. These flyboats serve twenty-eight pontoons or wharves and fifteen others are to be added as circumstances permit.

Berlin Recasts Its Municipally-Owned Railways

When a city of two and one-quarter million population actually shuts down its municipally owned street railways, as Berlin did for a short time last month, because no possible rate of fare makes the business pay, the American operator is entitled to a more convincing explanation than the easy hypothesis that politics must be at the bottom of it all. The real politics in the case is the downfall and practical annihilation of the German mark. There was some overstaffing of the municipalized street railway following the war because of unemployment among veterans, but more fundamental causes were the uneconomical rolling stock, the competition of the government railways in fares and of the direct-routed subways in service, and, worst of all, the wasteful routing taken over from the original private operators.

In seeking a remedy, the suggestion was made to follow other German systems by bringing private capital and management into partnership. It does not seem, however, that the coal and iron millionaires (gold, not paper marks) are anxious to fill a bottomless pit. What the city system did, therefore, in making its snap suspension of service on Sept. 7, was to place the affairs of the railway in the hands of a limited company or board of trustees composed of eleven city officials and one expert adviser. This board was given the authority to take the most drastic measures necessary. What has it done?

The board has no money for modern rolling stock and train operation of sufficient capacity to make the item of platform expense approach the more efficient ratio of the steam and electric rapid transit lines. The latest motor car seats only twenty-three passengers! It has, however, extended the use of one-man cars to at least nine light-traffic routes and no doubt will go further. Far more important than this has been a plan which is not so much a rerouting as an actual recasting of the entire system. One way of judging its thoroughness is to state that the first act of the trustees was to discharge the force of 11,000 men on two weeks' notice and to rehire only 4,000. Most of the others have been placed elsewhere by the city. The working day was lengthened by one and one-half hours and payment was based on platform time, with no allowance for waits between swings. The next step was to cut down to 100,000 car-km. (62,500 car-miles) a day to care for a traffic of 750,000 passengers a day on the basis of fifteen-minute normal and seven and one-half-minute rush-hour headways. This means that the railway expects only 275,000,000 riders a year, which is but one-half of pre-war times, not to mention the maximum of 900,000,000 riders in 1918-1919. Until the last year or so, the surface railways carried about one-half of the total traffic, so the significance of this fall can be appreciated.

In explaining the rerouting—the most important question of all—it is necessary to go back to the policy of the predecessor private company. Berlin was one of the few large cities in Europe built upon an American flat fare basis. But unlike American systems, the Berlin management was determined by all means to avoid the transfer. To make good its boast that a single fare would take the rider without a change of cars to any part of town (except in some western suburbs), the company had to adopt routings which became more and more circuitous as the city expanded. Aside from this, it was practically Gospel that every route must traverse the congested center.

Thus there came about a fearful and wonderful array of overlapping, roundabout and partially duplicating routes. The earlier efforts of the municipal railway, as the after-war pressure began to hurt, were confined to cuts in service and abandonment of the poorest lines. The present scheme is entirely different. All the available track was envisaged as a whole and then thirty-one routes were laid out on the entirely new basis of carrying the rider the shortest possible way to his destination whether he requires one car or two. Thus it has come to pass that the most important fare in Berlin is now the fare receipt providing for a one-time transfer privilege. On Sept. 11 the price of this fare with transfer was a mere 400,000 marks, while the single fare cost 350,000 marks. In other figures, the transfer costs some 15 per cent extra. The abandonment of weekly cards and other prepaid transportation will be understood when it is mentioned that no longer ago than November, 1922, the Berlin single fare was 30 marks and the fare with transfer 45 marks. Truly, it is an amazing and pathetic situation.

Electrification of Austrian Railways

There were 256 km. of the Austrian Railways already electrified and in operation on Aug. 1, 1923; 217 km. were being electrified, and it was proposed to electrify 408 additional kilometers. Approximately 17 per cent of the present total railway mileage of Austria is either electrified, under course of electrification or proposed to be electrified. In all it totals 881 km.

"Safety-First Mirrors"

Twenty Metropolitan Electric Tramway Company (London) cars have been experimentally fitted with mirrors to enable alighting passengers to see any vehicle which may be coming up behind them. In alighting, passengers have their backs to oncoming traffic, and these mirrors should therefore be of considerable assistance in minimizing the dangers of the road. If the experiment proves successful, all cars will be similarly equipped.

French Feeder Lines Being Electrified

Suburban traffic of railroads as it is known in the United States is practically non-existent in France. The same is true of interurban surface lines to a great extent. The electrification plans which were started in France a couple of years ago have not yet come into being with respect to the main line railways and only on the Orleans line out of Paris and on the State railway to Versailles is there anything which suggests that France is thinking about electrification.

The Paris, Lyons & Mediterranean Railway and the Midi Railway are in the forefront of electrification schemes. The former has just applied for a concession for establishing a hydro-electric power plant which shall furnish power for the mid-France line 100 km. in length, running through a mountainous country from Langogne to Alais.

More nearly completed is its international section from Culoz to Modane on the Italian frontier, which is the first to be operated by electricity, the company being assured the necessary power by arrangement with the Société d'Electro Chimie, d'Electro Metallurgie et des Aciéries Electriques d'Ugine in the high Alps. Primarily the latter company was an outgrowth of an electric steel plant which by the foresight of its directors anticipated the future possibilities of electric power generated by the water power of the Alps, and today sees the reward of its enterprise by being able to sell its unlimited current to one of the most important and the lengthiest of railways being operated in France.

The same company is laying out the system which shall ultimately furnish the current for the branch lines from Carnoules to Grasse, Cannes, Nice and Vintimille on the French Riviera, a district which one would think, because of the very nature of its traffic, would be the first to be electrified. A beginning has been made, but since it has all come into being since the war, at a period when French public and private finance has been at the lowest ebb ever known, it is perhaps not surprising that more has not been accomplished. Speeding up the installation will bring about immense economies, and if the $40,000,000 which was recently borrowed in the United States be so invested, there is no question but that return on the capital will be more earned.

Another project of this company is the building of an electric line between Avignon and Les Arcs on the main line to Vintimille and the Italian frontier, saving thus some eighty-odd kilometers over the present route. It is bound to come, but since it leaves Marseilles off to one side, 50 miles distant, powerful local interests there are against the project. Such is tradition in France, often a damper, always a hamper, against the adoption of something which in the long run will pay dividends above what might be foreseen by the most optimistic.

Financial and Corporate

Reorganization Planned

$48,000,000 Cut in Capital Liabilities of New York Railways — Charges and Rentals Cut $1,720,000

A committee appointed by Judge Mayer of United States Circuit Court at New York has presented a tentative plan for the reorganization of the New York Railways. The proposal as made by the committee contemplates the discharge of the receiver by Jan. 1, 1924, reorganization as a system of properties now operated by the receiver, and formation of a new company to acquire through foreclosure all assets and operating properties of the New York Railways, operating 71 miles of surface lines, mostly in Manhattan Borough. The new company will pay for the properties acquired by the issue of new securities directly to holders of the several issues of bonds of New York Railways, and its predecessor companies, and to creditors of New York Railways in exchange for their bonds and claims. The court has ordered the committee to hold hearings during the week of Oct. 22 and to report back during the week of Oct. 29.

It seemed plain to the committee that the reorganization must provide:

1. For a great decrease in fixed charges.
2. For a great decrease of the total capitalization.
3. For the elimination of all interest of the present stockholders of the company.

Proceeding on this basis the committee for one thing would wipe out entirely the $17,495,060 of stock previously oustanding. It is proposed that the company's fixed charges be reduced by approximately $720,000, the annual contingent charges by $650,000, and the fixed rentals previously paid by the New York Railways upon leased lines by $350,000. Beyond the cost of operation there will be practically no fixed charges remaining, except the interest to be paid upon a limited amount of underlying bonds that have never been defaulted, and the charges to be paid upon the new capital of $5,000,000. Returns upon all other security issues in the very much reduced list are to be paid only out of the actual earnings from year to year.

In short, the basic principles recommended by the committee are:

1. The system now operated by the New York Railways should be reorganized substantially as a system as now operated but with greatly reduced capitalization and annual charges.
2. No bonds bearing a fixed annual interest charge whatsoever should be issued by the new company, except for new cash actually contributed to the new company.
3. The only bonds to be left undisturbed should be those of leased lines on which no default has been made and on which the interest has been apparently earned during the receivership.
4. Other obligations now in default and now bearing a fixed charge should be replaced by income bonds on which no income will be payable unless actually earned.
5. These income bonds should be offered to the various units composing the system, but limited to the amount of the earnings actually shown to be contributed under present conditions to the system by these various units.
6. Various units which do not receive the principal or par amount of their present obligations in income bonds because the earnings are insufficient should receive the balance due to them in preferred stock of no par value, but no unit should receive more than the principal or par amount of its present existing obligations.
7. No new securities should be issued for arrears of interest or rent which has not actually been earned during the receivership.
8. The existing capital stock of $17,500,000 par value should be eliminated in the reorganization.

The result is a large reduction in fixed charges and capitalization:

Thus the fixed charge bonds are reduced by	$18,000,000
Income bonds are reduced by	13,000,000
Total reduction in obligations	$31,000,000
The fixed charges are reduced by	720,000
The annual contingent charges are reduced by	650,000
Fixed rentals are eliminated by	350,000

Common Stock for Cash Contributors

The first mortgage 5 per cent bonds of the Broadway Surface Railroad of 1924 in principal amount of $1,500,000, and $350,000 South Ferry Railroad first 5s of 1919 are to remain undisturbed but are to be offered the right of conversion into an equal face amount of Broadway Consolidated mortgage bonds. The plan provides that $250,000 Central Crosstown Railroad first 6s of 1922 are to be extended but not otherwise disturbed.

To furnish adequate working capital for the company the plan recommends the use of $5,000,000 prior lien bonds to be issued in reorganization. The cash required must come from the liquidation of non-operative assets which go chiefly to holders of New York Railways first and refunding bonds unless arrangements are made for obtaining additional capital from other sources. The persons contributing the cash, according to the plan, will receive all common stock of new company, together with new prior lien bonds, at such prices as may be determined against cash advanced.

In the interest of closer co-operation of the company and the public, it is proposed that the board of directors shall contain representation of the public named by public authority.

In a statement which he issued commenting on the plan George McAneny, chairman of the New York Transit Commission, said:

> Great credit must be given Judge Mayer for the part he has continued to play in bringing these demoralized railway properties back to an orderly condition, and in everything that it has dohe touching any of the property affected the commission has been able to work in close cooperation with him. It has been a matter of teamwork throughout, in which the wise and constructive use of the powers of the court by Judge Mayer has been a dominant factor in the progress that has been made.

The members of the committee who signed the report were Bronson Winthrop, Joseph P. Cotton, Charles P. Howland and Henry V. Poor.

Frank D. Pavey, a member of the reorganization committee, will file a

NEW COMPANY CAPITALIZATION

	Principal	Annual Interest
Undisturbed bonds	$15,350,000	$765,500
New fixed charge bonds, say	5,000,000	250,000
New income bonds, say	17,500,000	875,000
New Preferred stock, no par	120,000 shares*	
Common stock, no par	1,000 shares	

COMPARISON WITH FORMER CAPITALIZATION
(approximately)

Reduction of face amount of fixed charge bonds (after providing reorganization capital) (approx.)	$18,000,000
With reduction of an annual fixed charge of (approx.)	720,000
Reduction of income bonds (approx.)	13,000,000
With reduction of an annual contingent charge of (approx.)	650,000
Elimination of fixed rentals (payable on outstanding minority stock interests) per annum of	349,066
Elimination of old capital stock	17,495,060

* This includes an allotment of .25 of a share of preferred stock for each $100 face value of general claims against New York Railways. The amount of such general claims is estimated at the present time at about $5,000,000.

SECURITIES TO REMAIN UNDISTURBED

	Principal	Annual Interest
Broadway and Seventh Ave. 1st Cons. Mortgage 5%, due Dec. 1, 1943	$8,150,000	$407,500
Broadway and Seventh 1st Mortgage 5%, due June 1, 1904	1,500,000	75,000
34th St. Crosstown Railway Co. 1st Mortgage 5%, due April 1, 1996	1,000,000	50,000
Bleeker St. and Fulton Ferry Railroad 1st Mortgage 4%, due Jan. 1, 1950	700,000	28,000
23rd St. Railway:		
Improvement and Refunding Mortgage 5%, due Jan. 1, 1962	1,500,000	75,000
1st Mortgage 6%, due Jan. 1, 1909	250,000	15,000
Debentures 5%, due Jan. 1, 1906	150,000	7,500
Total	$13,250,000	$658,000

SECURITIES TO BE EXCHANGED FOR NEW INCOME BONDS OR PREFERRED STOCK

	Principal	Annual Interest
New York Railways:		
Thirty-year first real estate and refunding mortgage 4% gold bonds, dated Jan. 1, 1912	$18,061,289	$722,451
Convertible scrip 4%	2,250	90
Thirty-year adjustment mortgage 5% income bonds, dated Jan. 1, 1912	30,609,487	(Income Bonds)
Lexington Ave. & Pavonia Ferry Railroad first mortgage 5% bonds, due Sept. 1, 1933	5,000,000	250,000
Sixth Ave. Railroad capital stock, par value	2,000,000	......

minority report probably in time for the hearing.

Other members of the committee explained the paragraph in their report which read: "Each member of this committee who represents a class of security holders has expressed the view that the plan does not sufficiently protect the interests of his clients," as being merely a formal statement and having no significance.

Abandonment Approved

The Public Service Commission of Pennsylvania has authorized the Pennsylvania-New Jersey Railway to abandon and discontinue its service between Bristol and Doylestown, Pa. The application was made by the company on Feb. 15 last and several hearings were held on the matter. No date has been set for the abandonment.

The property consists of 26 miles of track. The road was built thirty years ago. Gaylord Thompson, general manager, says that the corporation lost $25,000 during 1922 on that branch. It is believed that buses will replace the railway.

Increased Fare Results in Profit for Seattle

The Seattle Municipal Railway earned a net profit of $4,655 in August, according to the monthly financial statement sent to the City Council by Superintendent D. W. Henderson. The gross profit was $74,905 before deduction of a charge of $70,250 for redemption of bonds. Revenues for the month totaled $531,134 and operating expenses were $389,774, with interest charges of $66,455 in addition. July, the first full month under the restored 8⅓-cent fare, showed a net profit, due to economies effected, Superintendent Henderson states, but the railway has a deficit accumulated under the 5-cent fare.

August Net in Detroit Low—September Net Estimated at $45,000

The total revenue of the Detroit Street Railway for the month of August was $1,754,349, against $1,606,833 for August, 1922. The total operating expenses were $1,314,975 against $1,097,270 for the month of August a year ago. This means that revenue from railway operations was $439,375 compared with $509,564 a year ago. The net income for August of this year was $7,940, a considerable falling off in comparison with August, 1922, when the net income was $114,801. The total number of passengers carried in August of this year was 41,308,449 and in August, 1922, the passenger traffic was 37,372,148. Due to the increase in fares from 5 cents to 6 cents the net income for the first fifteen days of September showed an increase of $38,000 over the month of August. It is estimated that the net for the month will be about $45,000.

Foreclosure Action Started in St. Louis

A foreclosure suit in behalf of the Northern Trust Company, Chicago, trustee for $1,640,000 of the $2,000,000 bond issue of the Cass Avenue line of the United Railways, of St. Louis, has been filed in the United States District Court in St. Louis.

The petition asked that the court issue an order making Receiver Rolla Wells a party defendant to the suit. This request was granted by Judge Faris.

This is the second foreclosure action pending against the United Railways since Judge Faris declined to permit Receiver Wells to liquidate outsanding indebtedness against the railway by issuing additional receiver's certificates.

Morton Jourdan filed the suit for the Northern Trust Company. He is also counsel for the North American Company, which controls the common stock and most of the general 4 per cent bonds of the United Railways.

The bondholders' protective committee representing the holders of the United Railways general mortgage has recently authorized its attorneys to notify the trustee under the mortgage, the St. Louis Union Trust Company, to notify the company that the bonds are in default.

The directors of the United Railways at their meeting on Oct. 9 authorized the appointment of a committee representing the various financial interests in the company and probably the public as well to take steps looking to a quick re-financing and re-organization of the property.

The notice to the St. Louis Union Trust Company is the first legal step looking to a foreclosure suit on the entire property of the United Railways.

Preferred Stock Offered in Toledo

In order to promote community interest in the traction lines of the Community Traction Company, Toledo, a block of $43,140 of the 8 per cent preferred stock of the company, issued under the Milner ordinance to finance new construction work in Spencer Street, has been offered to the public in $10 shares.

Henry L. Doherty, chairman of the board of the company, has notified President B. C. Adams that in order to complete the work immediately he will take all of the stock, but that he will offer it at par to citizens of Toledo without profit to himself. The stock has been sold over the counter at the traction company office.

Under the ordinance the city has acquired $476,000 of the common stock of the company issued to it upon retirement of a like amount of the 6 per cent first mortgage bonds through the working of a sinking fund.

Car cards, posters and newspaper advertising have been used to bring the offering to the attention of the public.

It is quite probable that floating debt incurred under the provisions of the ordinance for improvements will be funded later through additional issues of preferred stock. However, at no time can the securities of the company exceed actual value of the property. Operations of the sinking fund tend to improve the relative position of the preferred stock.

Exchange Offer Announced

An offer to take up the stock of the Tri-City Railway & Light Company and to give in its place stock in the United Light & Railways Company, has been made by the latter corporation, the big holding company which controls the Davenport utilities. This offer holds good until Nov. 1, according to formal announcements which have been mailed all the holders of the Tri-City Railway & Light Company preferred stock. The conversion offer provides for the giving of 6 per cent preferred stock of the United Light in return for the 6 per cent preferred of the Tri-City issue.

The basis of exchange is one share of Tri-City for one share of the United Light and $8 in cash, or ten shares of Tri-City for eleven shares of United Light. It is stated in the offer that in the first six months of 1923 the dividend of the United Light 6 per cent preferred stock was earned three and a third times. The United Light already owns all the common stock and some bond of the Tri-City.

Seeks to Abandon Lines

The San Diego Electric Railway has applied to the State Railroad Commission for permission to abandon its line from Logan Avenue along Thirty-second Street to the United States destroyer fleet repair base. Stub service is operated on the line to connect with the Logan Avenue cars, and the line is patronized almost exclusively by employees of the repair base. According to Claus Speckels, general manager, the shipping board has failed to keep its agreement dating from the time the line was built in 1918. The shipping board advanced $46,000 toward construction of the line, which was not to be returned until the shipping board had constructed as many as eight ships at the yards. Only two ships were ever built, consequently Mr. Speckels holds that the shipping board failed to carry out its agreement. The shipping board has made a demand for the return of its money. Mr. Speckels contends that the company cannot operate the line on present patronage if the shipping board's money is to be returned, and hence he has asked for permission to abandon service. Manager Speckels says he offered to rebuild the line if the shipping board would permit the company to keep the money advanced, but the offer was rejected. The line is about one-half mile, single track.

Buys Interest.—A controlling interest in the Wapsie Power Company has been purchased by the Iowa Railway & Light Company. The Wapsie company's headquarters are at Mount Vernon.

Trustees of Eastern Massachusetts Company Say Dividends Unwarranted

The Eastern Maccachusetts Street Railway and its trustees, Boston, Mass., have filed their answer to the suit brought by L. Sherman Adams and others to compel a larger disbursement of dividends on adjustment shares. It is denied that any dividends have been wrongfully withheld or that any had accrued in February, 1923. On the other hand, it is asserted that no dividends on any class of stock were to be paid unless fully earned and that the financial condition of the company does not warrant the payment of additional dividends.

The trustees claim that when control of the company passed to them in January, 1919, the property had been operated for a year and a half by receivers at a loss of $1,295,291 and they were obliged by a decision of the War Labor Board to pay additional wages aggregating $941,733 annually. A 10-cent fare was established and every economy practiced. In spite of this the company failed to earn the cost of service in 1919 by $589,920. During 1919 and 1920 124.1 miles of line were discontinued as non-paying, but owing to higher operating costs and another wage advance another deficit resulted. In 1921 conditions improved, but at the end of that year arrearage of unpaid accumulated dividends and sinking funds, aggregating $2,633,457 on Feb. 1, 1922, could not be met except through a financial readjustment which was finally effected.

The trustees have felt that the earnings and the financial condition do not warrant payment of any dividends other than those that have been paid, particularly in view of the fact that wages were again advanced, effective May 1, 1923.

Robert R. Landis Appointed Receiver of Ohio Property

Following a conference of attorneys representing both sides in the foreclosure and receivership suit of the First Wisconsin Trust Company, Milwaukee, against the Dayton, Springfield & Xenia Southern Railway, with United States District Judge Smith Hickenlooper at Cincinnati on Oct. 13, Robert R. Landis, Dayton attorney, was named by Judge Hickenlooper as receiver of the traction company's assets with directions to continue operations of the system in and out of Dayton.

Judge Hickenlooper fixed Mr. Landis' bond at $30,000, which was given simultaneously with his appointment. Mr. Landis was named by the court as a result of the failure of the parties to the action to agree upon a person to be appointed receiver. The complainant desired the appointment of A. H. Elfner, former general manager of the Cincinnati, Georgetown & Portsmouth Railway, while the defendant sought the appointment of A. L. Ferneding, of Dayton, present general manager of the defendant company.

The bill of complaint of the First Wisconsin Trust Company was filed in the Federal Court at Dayton Oct. 2. In the suit, it was alleged that the traction company had defaulted interest due on outstanding bonds, of a bond issue of $500,000 secured by mortgage to the trust company. The matter was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 13.

Valuation Hearing at Minneapolis Under Way

The valuation hearing of the Twin City Rapid Transit Company, operating in Minneapolis and St. Paul, has started before the Railroad & Warehouse Commission. A. M. Robertson, the first witness on Oct. 10, did not reveal the amounts to be claimed as investments. More than a year ago the commission authorized an increase from the 6-cent fare to a 7-cent fare, but this was held up by court injunction.

Master Recommends Pittsburgh Receivership Be Lifted

The final report of Special Master Henry G. Wasson in the Pittsburgh Railways case has been filed with the United States District Court. Mr. Wasson recommends the termination of the receivership of the railway, which has been in receiver's hands for the last five and a half years. Should the court approve the report, as expected, the company will pass out of the receiver's hands by Jan. 1, 1924.

Application to lift the receivership was made on Feb. 15, 1923, by President A. W. Thompson of the Philadelphia Company, which controls it. The city of Pittsburgh had joined with the company in a reorganization plan, the joint agreement including the creation of a traction conference board composed of company officials, members of the City Council and representative from each of the municipalities served by the railway.

No reduction in rate of fare from the present fare of three tokens for a quarter is probable, as the master's report states this fare is necessary if the road is to continue operations on an equitable basis.

As has been detailed previously in the ELECTRIC RAILWAY JOURNAL the capitalization under the reorganization plan was scaled down from $156,290,750 to $62,500,000 and under agreement with the city, the company will be entitled to receive a net return after charges and depreciation of $3,750,000 annually.

Twelfth Annual Report Submitted

According to the twelfth annual report of the Toronto Hydro-electric System, the gross income for the year ended Dec. 31, 1922, was $4,404,754. The cost of electric current and expense of operation and management, including repairs and maintenance, was $3,053,110. After consideration of the interest, depreciation, exchange, taxes, etc., the excess of income over expenditure at existing rates amounted to $232,041.

Temporary Injunction Against Chicago Sale

A temporary injunction was issued on Oct. 9 restraining the Illinois Merchants Trust Company from selling $14,000,000 securities of the Chicago Elevated Lines. The petition for the injunction against the sale was filed by preferred stockholders of the elevated lines through their attorney. They charge that the sale of these securities is part of a conspiracy.

Attorney Frank H. McCullough, representing the Illinois Merchants Trust Company, opposed granting of the injunction. He said no interest has been paid on the $14,000,000 gold notes held by his clients since 1919 and said the noteholders were entitled to their interest at least. Therefore, collateral security notes should be sold.

The restraining order was granted by Circuit Judge Hugo M. Friend. The court in granting this restraining order said:

> In view of the allegations of the complainants in which they charge that the trustees had caused the default in interest payments by making unauthorized loans and had otherwise diverted funds of the trust without authority, it is necessary, in the absence of denials, to issue the injunction.
>
> If the sale, scheduled to be held on Oct. 15, is consummated the complainants in this suit will be powerless to recover any losses they may consequently have sustained. On the other other hand, this sale has been delayed since 1919, when the first interest payments were defaulted, and further delay can work no injustice on the gold note holders.

Judge Friend advised Attorney Henry S. Robbins, representing the holders of the gold notes, to file an immediate answer to the bill. If the gold note holders can make positive denials of the bill's charges and support them with competent evidence, the injunction would be dissolved, he said.

Sale of $2,496,557 of Bonds Authorized

The Public Utilities Commission of the District of Columbia has authorized the Washington Railway & Electric Company to:

1. Place a general mortgage of $10,000,000 on its property, subject to prior liens.
2. Issue and sell $2,496,557, face value, of its general and refunding 6 per cent ten-year gold bonds secured by the general mortgage.
3. Issue and pledge with the United States Housing Corporation $150,000, face value, of its general and refunding mortgage 6 per cent ten-year gold bonds dated Nov. 1, 1923, in lieu of a like amount of its general mortgage 6 per cent five-year gold bonds, the latter bonds to be retired and cancelled.

The issue and sale of the bonds were authorized upon the conditions that follow:

1. That the company sell the bonds at the highest obtainable price.
2. That all discounts, commissions and expenses in connection with the approval and issuance of the bonds be amortized out of the income of the company during the life of the bonds.
3. That the general mortgage 6 per cent five-year gold bonds due Dec. 1, 1923, be paid off, retired and cancelled.
4. That the company show the receipt and application in detail of the proceeds of the sale of the bonds and on or before the fifteenth day of January and the fifteenth day of July make verified reports to the commission until the bonds shall have been sold and all of the proceeds expended.

West End May Suspend

The West End Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company, has filed a petition with the Ohio Public Utilities Commission asking permission to abandon its service. The hearing has been set for Nov. 16 at Columbus.

The West End Traction Company operates 24 miles of track. The principal route is a 15-mile interurban line connecting Youngstown and Girard, Niles and Warren. In addition there are short suburban lines from Niles to Mineral Ridge and from Warren to Leavittsburg. There are also approximately 5 miles of city track operated in Warren. All the trackage is in Trumbull County, Ohio.

In its petition the West End Company points out that in meeting operating costs, including taxes, it sustained the following losses: $108,845 in 1920, $129,602 in 1921, $71,449 in 1922 and $31,829 in the first seven months of 1923, or a total of $341,725 for the period. Without material relief in the form of increased rates, it is pointed out there is no hope of operating, excepting at continued heavy losses.

Receiver Appointed in Owensboro

W. A. Carson of Evansville, Ind., has been appointed receiver for the Owensboro City Railroad, Owensboro, Ky., by Federal Judge Walter Evans of Louisville. The action was taken on a petition of the American Savings Bank & Trust Company, trustee for the bondholders, against the company, seeking to foreclose a mortgage securing $200,000 of bonds. It was set forth in the petition that 71 per cent of the bondholders joined in the petition for the appointment of a receiver.

The system will continue to be operated under Receiver Carson until a decree of some kind is entered in federal court. The system will probably be ordered sold. The bonded indebtedness is $400,000, half being first mortgage bonds and half second mortgage bonds. The company has been unable to pay the interest on the bonds for the last six years, the money intended for the bondholders going for the upkeep of the system.

Court Rejects Plea

Supreme Court Justice Irving Lehman on Oct. 13 declined to give judgment on the pleadings to Stephen and Nina H. Peabody, Manhattan Railway stockholders, in a suit against the Interborough Rapid Transit Company, New York, to compel the payment of 7 per cent per annum dividends to Manhattan stockholders, under the 999 years' lease of the Manhattan's elevated lines to the Interborough.

The Peabodys began suit in 1921, when the 7 per cent payments were discontinued and proceedings instituted to arrange for a lower rate of dividends. The plaintiffs asserted that the defendant company had guaranteed the payment of 7 per cent on Manhattan stock. Justice Lehman holds that the Interborough's agreement was with the Manhattan Railway and not with its individual stockholders; that the 7 per cent was to be paid as rent; that the amount of rent to be paid may be changed, by agreement between the two companies, under changing conditions, and that the promise to pay 7 per cent "could not survive a valid revocation or modification of the lease by the parties to the lease."

The scaling down of the Manhattan dividend payments was one of the considerations agreed upon by the great bulk of the stockholders of that company as part of the recent readjustment of Interborough finances.

Auction Sales in New York.—At the public auction rooms in New York on Oct. 17 there were sold $1,000 of Southern Indiana Gas & Electric Company 6 per cent bonds, due 1947; 90 per cent.

Will Redeem Notes.—All of the outstanding $3,600,000 five-year 7 per cent secured gold notes of the Milwaukee Electric & Light Company, known as series A-1, will be redeemed Oct. 31, 1923, at par and interest. The bonds are due Nov. 1, 1923.

Financing of Electrification Arranged.—The Illinois Central Railroad has applied to the Interstate Commerce Commission for authority to issue and sell $12,022,450 of 6 per cent preferred stock, the proceeds to be used for the electrification of the company's lines within the city of Chicago. It also asked permission to issue a like amount of common which is to be issued from time to time in exchange for and retirement of the preferred, share for share.

Wants Property Auctioned. — An order was entered in Circuit Court on Oct. 12 directing the master commissioner to offer for sale at auction the property of the Henderson Traction Company on Oct. 29. The city of Henderson was awarded a judgment of $4,548.35 with 6 per cent interest from July 28 last which is a prior lien on the property for street oiling tax. The railway ceased operation July 15, when it defaulted payment of interest.

Highest Net Since 1913.—The returns of the United Railways, St. Louis, during the year ended July 31, 1923, exceeded the earnings for each calendar year from 1913 to 1922, according to figures just issued by Receiver Rollo Wells. The gross earnings for the year totaled $20,648,831, and after expenses and depreciation charges had been paid the net income for the period was $3,720,133. The previous high record was established in 1920, when the income was $3,701,442.

Requests Deposits.—The bondholders' protective committee for the first mortgage sinking fund gold 5s. of the Waterloo, Cedar Falls & Northern Railway has announced that it has decided to limit the time for the deposit with the committee of further bonds under the bondholders' agreement of Nov. 15, 1922 to Nov. 1, 1923. After this date no additional bonds may be deposited under the protective agreement except at the discretion of the committee.

Another Hearing on Carhouse Sale.—Adjourned hearing of the argument on the application of the Broadway & Seventh Avenue Railway, New York, to cancel a lease held by the New York Railways on the carhouse block, Broadway, Sixth Avenue, Fiftieth and Fifty-first Streets, will be held on Oct. 22 in the Federal District Court. This is preliminary to the sale of the block for $5,000,000, to a syndicate headed by Tex Rickard, which plans to build an athletic sports' center.

Hearing on Allocation Case Oct. 27.—Hearings on the suit of the city against Detroit United Railway over the proper allocation of the Detroit United Railway's consolidated mortgage to lines purchased by the city have been postponed to Oct. 27, at which time briefs will be submitted. The lines acquired by the city for $19,000,000 are covered by a consolidated mortgage of $25,000,000 given by the Detroit United Railway on its interurban lines and its former city lines now owned by the city of Detroit.

Earnings Behind in Youngstown in August.—According to an announcement by Street Railway Commissioner Engel, the revenue from the combined railway and bus lines of Youngstown, during the month of August, failed by $17,853 to pay the cost of operation. This sum will be added to the previous deficit of more than $1,000,000. Mr. Engel's statement says that the earnings were $136,124, and the cost of operating $154,738. The total number of car miles furnished in August was 416,847. The service cost per car mile was 37.15 cents. The cost per car-hour was $3.23.

Fails to Pay Cost of Service in August. — During August the Boston Elevated Railway failed to pay for the cost of service by $319,516. The deficit was larger in August this year than it was in August, 1922, when the road went behind $217,128. The total number of revenue passengers during the month was 28,086,112, against 26,877,682 in August a year ago. The percentage of passengers paying a 5-cent fare to the total number paying had increased in the year from 22.33 per cent to 25.50 per cent. The average rate of fare was reduced from 8.883 cents in August, 1922 to 8.713 cents in August, 1923.

Offer Made for Exchange of Tri-City Shares.—The stockholders of the Tri-City Railway & Light Company, Davenport, Iowa., a subsidiary of the United Light & Railways, Grand Rapids, Mich., have received an offer from the latter company to exchange the 6 per cent first preferred stock of United Light & Railways, for the 6 per cent preferred of the Tri-City Railway & Light Company on the following basis: Each ten shares par value $100 of the 6 per cent preferred of the Tri-City may be exchanged for eleven shares (par value $100) of the United Light & Railways 6 per cent preferred. The offer is good until Nov. 1.

Traffic and Transportation

Decrease in Fare Opposed

President Ham of Washington Railway & Electric Company Says Fair Return Is Not Being Earned

Opposing the request of the Federation of Citizens' Associations that the District of Columbia Public Utilities Commission order the railways of Washington to sell three tokens for 20 cents, William F. Ham, president of the Washington Railway & Electric Company, testified before the commission on Oct. 15 that he estimated such an order would cost that company $104,207 loss of revenue per annum. Mr. Ham also declared that compliance with the order would slow the service, as it would increase the number of token sales conductors would be obliged to make.

The fare in Washington is 8 cents, cash, with six tokens for 40 cents. The Citizens' Federation petitioned for three tokens for 20 cents, on the ground that many passengers did not find it convenient to buy six tokens at a time and hence were forced into paying the cash fare of 8 cents. At the hearing on Oct. 15, William McK. Clayton, attorney for the Federation, suggested that if the commission did not consider it wise to order three tokens for 20 cents, the cash fare should be reduced to 7 cents.

Figures were presented by President Ham to show that of the present pay passengers carried by the Washington Railway & Electric Company, 20.33 per cent rode on cash fares and 79.67 on tokens. He estimated that if the suggested plan of selling three tokens for 20 cents were adopted only 10 per cent of the present passengers would pay the 8-cents cash fare in the future, thus bringing the $104,207 annual loss to the company. He expressed the opinion that most cash fares are paid by visitors in Washington, or casual riders, and that no benefit would accrue to the regular passengers.

Statements were introduced by Mr. Ham showing that in the twelve months ended Aug. 31, last, the gross revenues from operations within the District of Columbia were $5,576,995, a decrease of $77,609 compared with the preceding twelve months. During this period, operating expenses, taxes, etc., were $4,825,824, an increase of $37,955. This left $751,170 available for return upon investment for the year ended Aug. 31, 1923, or a decrease of $115,564 compared with the previous twelve months.

Mr. Ham showed that the fair value of the properties, as fixed by the commission, is $17,871,366, making the present return upon the investment 4.2, compared with 4.94 for the preceding year.

Statements also were introduced by Mr. Ham showing that during the same periods, the operating revenues of the Washington Railway & Electric Company and the Capital Traction Company, combined, had decreased $305,375 and that the operating expenses, combined, had increased $61,835, making a decrease in operating income of both companies of $367,210.

From these statements, Mr. Ham computed that during the year ended Aug. 31, 1923, the Washington Railway & Electric Company earned only 4.2 per cent upon its fair value as fixed by the commission, while the Capital Traction Company had earned 7.66 per cent upon its valuation, and both companies combined had earned 5.87 per cent upon their joint fair value. The Washington company had failed by $499,824 to earn a 7 per cent return and the Capital Traction Company earned $109,769 more than a 7 per cent return, his statement showed, while both companies combined had earned $390,054 less than a 7 per cent return.

Mr. Ham further showed that traffic in the District of Columbia has fallen continuously since 1919, the peak year. In 1919, he testified, both companies had carried 166,113,350 pay passengers, whereas during the year ended Sept. 30, 1923, the combined traffic of both companies had fallen to 143,398,130, a loss of 22,715,220 passengers, of which about one-third had been sustained by his company and two-thirds by the Capital Traction Company. This tendency was not abating, he said.

Trackless Trolleys Start in Philadelphia

Philadelphia had its first experience with trackless trolleys on Oct. 14 when the first vehicle of this type of transportation traversed Oregon Avenue and east to its terminus at the Tidewater Docks at Delaware Avenue. In the car were J. W. Hall, superintendent of instruction; instructor John Holland, division superintendent Worlin and assistant superintendent Van Horn of the Sixteenth and Jackson Streets carhouse. It took exactly thirty-five minutes for the car to arrive at its starting point.

This line of trackless trolleys is run over Oregon Avenue in order that service may be promptly supplied to the 2,000 men now employed at the Tidewater Docks, and to the growing population south of Snyder Avenue, who would otherwise be without car service for some considebale time to come.

The company has announced through Thomas E. Mitten, chairman of the executive committee, that just as soon as the trackless trolley operation on this route has passed its experimental stage the company will be glad to consider the advisability of extending the service westerly over Passyunk Avenue and Sixty-third Street to Woodland Avenue.

Will Advance Shreveport Fare Case

The United States Supreme Court on Oct. 15 granted the motion of the Louisiana Public Service Commission to advance argument on its appeal from the ruling of the District Court in granting an interlocutory injunction to the Shreveport Railways restraining the commission from interfering with collection of a 7-cent fare in Shreveport, La. The case was set for Jan. 7.

It is three years since the fare controversy started in Shreveport. In 1920 by a vote of the people, the railway company was allowed an increase from 5 cents to 6 cents. The election was contested by Huey P. Long, chairman of the Louisiana Railway Commission, acting as a citizen of Shreveport. The State Supreme Court upheld it. In 1921 when the state Constitutional Convention changed the name of the railway commission to the Public Service Commission it gave the Public Service Commission authority to fix rates. In April, 1922, the commission issued an order without a hearing, fixing the car fare in Shreveport at 5 cents.

After an appraisal of the property had been made by valuation engineers, the Public Service Commission granted a hearing on the application of the company for an increase in fare at which evidence was submitted on both sides on the question, but the commission failed to make a decision. The company then appealed to the United States District Court and secured a temporary injunction against the commission restraining that body from interfering with the company's collecting a 7-cent fare. Huey P. Long, chairman of the commission, then sought and was granted an appeal to the United States Supreme Court. He based his appeal on the plea that the Federal District Court was without jurisdiction.

Ban Put on One-Man Cars in Oakland

An ordinance was passed to print on Oct. 8 by the City Council of Oakland, Cal., which prohibits the operation of one-man cars in the city. The Council adopted the measure without comment, the ordinance to become effective within eight days. The action by the Council was initiated by Mayor Davie. In urging that body to legislate on the matter the Mayor said in part:

> The San Francisco-Oakland Terminal Railway has recently placed in service a new type of car, capable of accommodating more than forty passengers, which is so constructed that it may be operated by a crew of two men or as a one-man car.
>
> I do not believe that the company should be permitted to operate these new large cars with only one man in charge in the downtown traffic. I feel that public safety and welfare demand that street cars be in charge of two men if they are to be operated through those sections of the city where there is a heavy volume of general traffic.
>
> This company is still charging our people war-time rates for transportation, at the same time endeavoring to reduce the car operating personnel at the expense of public safety.

Crosstown Bus Service to Be Started by Utah Light & Traction

The Public Utilities Commission of Utah has granted permission for the Utah Light & Traction Company to operate a crosstown bus line to connect with its street car line at State and Thirty-third South Streets and to run east to the community known as East Mill Creek. The bus fare has been fixed at 10 cents and special rates for school children are to be put into effect.

The matter came before the commission originally on the petition of the Blue & Gray Bus Line, which proposed to continue the service from East Mill Creek to reach the business center of Salt Lake City, in competition with the traction company. To that petition the railway protested, and finally introduced a petition in intervention, asking the privilege of starting, in place of the proposed service to Second South Street, a "feeder" service which would connect with its lines on the Holliday and Nibley Park routes and on the several routes running south on State Street.

The Blue & Gray Bus Line did not care, it was set forth, to operate buses as feeders to the traction company's lines without giving also the through service to the business center.

In rendering its decision the commission stated that a certain sum of money is necessary to carry on the street railway business, which money must be collected in the form of fares from the traveling public. It said that to deplete the revenues of the railway by authorizing a competitive bus service would only restrict still further the company's ability to give service, and, if the competition were carried to its logical conclusion, would utterly destroy the service so necessary to many. The necessities of the general traveling public must be considered, rather than the convenience of the few.

Trackless Trolley Ready in Rochester

The Rochester Railways Coordinated Bus Lines, Inc., a subsidiary of the New York State Railways, awaits only the sanction of the State Public Service Commission to begin the operation of trolley buses over a crosstown route through the northeast end of Rochester, N. Y. Two of the trackless cars have already been received and the other three are in transit, according to officials of the railways.

The state commission held a public hearing on the application of the company for permission to operate the line in Rochester on Oct. 15. The decision of the commission is expected at an early date. Poles and wire have been strung and all is in readiness for the new line, which is regarded as a decided step forward in Rochester transportation facilities.

The trolley buses will operate over Driving Park Avenue bridge and will serve a fast growing industrial and residential district.

Auxiliary motor bus service will be operated from the end of the Dewey Avenue car line to Latta road, in Greece. This line will begin operations on the arrival of equipment, which is expected within a few days.

Weekly Ticket in Effect.—The Wisconsin Traction, Light, Heat & Power Company, put into effect on Oct. 1, a weekly ticket plan.

Petition Tabled.—The City Council of Youngstown has laid on the table the request of the Pennsylvania-Ohio Electric Company to establish an additional rate of fare on the Youngstown Municipal Railway lines.

Will Operate One-Man Cars.—The Milford & Uxbridge Street Railway, Milford, Mass., is preparing to put one-man cars in operation by Nov. 1, on the Grafton and Upton electrified line. It will be the first time that one-man car service has been operated on any of the lines of the company.

Will Apply for Bus License.—James F. Jackson, chairman of the board of trustees of the Boston Elevated Railway, has notified those interested in car service on Hanover Street, recently discontinued, that the trustees will apply to the City Council for a license to operate buses to and from Haymarket Square as a substitute for the former service.

Commission Approves Fare Plan.—Final approval has been given by the Wisconsin Railroad Commission to the agreement recently reached by Superior City officials and the Duluth Street Railway. The plan referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 15, provides for a 10-cent cash fare in Superior with five tickets for 30 cents.

Weekly Edition Appears.—The Spokane United Railways, besides publishing its regular edition of "Trolley Topics," has introduced a supplement, published weekly, which is now appearing in the Spokane daily newspapers every Thursday. The supplement will report news regarding operation of the Spokane United Railways as well as important developments in the street railway industry of the country.

Jitneys Allowed.—The new ordinance at El Paso, Tex., barring buses and motor vehicles carrying passengers for hire from certain streets has been held void by Judge Stewart Berkshire of the Corporation Court. Approximately forty jitneys that had stopped operation when the ordinance was first enacted immediately resumed operations.

Joint Five-Cent Fare and Transfer Confiscatory.—Federal Judge John C. Knox, at New York has confirmed conclusions of former Judge E. Henry Lacombe that a joint 5-cent fare and transfer on the Belt Line Railway, New York, would be confiscatory. Judge Lacombe rendered his decision in 1912 against the former Public Service Commission. A temporary injunction was obtained by the Belt Line Railway Corporation and that has held until now, and will by this decision be made permanent.

School Tickets on Sale.—The Northport Traction Company, Northport, N. Y., now has on sale tickets in strips of ten for 50 cents, each ticket having the face value of 8 cents, for the transportation of children of five years of age and under sixteen years who are regularly attending public or private schools. The tickets are good on school-days only and between the hours of 8 a.m. and 5 p.m. This new order approved by the commission became effective Oct. 10.

San Diego Merchants Give Weekly Pass as Premium.—From voluntary mention in their advertisements that patrons should shop often with no extra cost via weekly pass, several San Diego merchants have gone a step further. A half-page advertisement of "The White House" in the San Diego *Union* for Sept. 23 announces the first of a series of Monday weekly pass special events. With every $10 purchase on Monday, the concern will give a dollar pass to San Diego city customers or a $1.25 pass to Coronado customers.

Eight-Cent Fare Suspended.—The Public Service Commission has suspended the 8-cent fare which the International Railway, Buffalo, had planned to put into effect on the local lines on Oct. 8. The fare has been suspended for a period of four months or at least until the determination of the rate case now being held before the commission. The International has not presented all of its evidence in the rate case and the municipal authorities have presented practically no proof in the proceeding. The appeal of the city from decisions of the Public Service Commission authorizing the company to charge a fare higher than 5 cents will be argued by George Clinton, special counsel for the city, before the United States Supreme Court at Washington sometime before next February.

Jitney-Car Situation Acute.—On orders of Safety Director Hamilton all jitneys were ousted from Central Square in Youngstown on Sept. 26. A still further development in the story of the jitneys in that city was the passing by the Council of a new ordinance shoving the jitneys further away from Central Square and their established parking places. The ordinance was prepared by Street Railway Commissioner Engle. At the same time the Council tabled indefinitely an ordinance fathered by Ross Raymond, head of the jitney men, which would have permitted the jitneys to park in their regular place in Central Square. The Council, also tabled the ordinance giving the safety director full jurisdiction over traffic regulations in the congested district. It is understood with the new restrictions in force that a well-defined plan is under way to bring the jitney-car controversy before the citizens at a special election. The new ordinance is an attempt by the Council to correct provisions in a previous ordinance held by the court to be worthless.

Personal Items

George Le Boutillier, President of the Long Island

George Le Boutillier has been named president of the Long Island Railroad to fill the vacancy caused by the death of Ralph Peters. It was on Jan. 18 of this year at a meeting of the board of directors that Mr. Le Boutillier was elected an additional vice-president to assist the president in the general control of affairs of the company, and in the absence or disability of the president to exercise and perform all the powers belonging to the latter. Mr. Le Boutillier is only forty-eight years old. He has consecutively held the positions of assistant engineer, division engineer, engineer maintenance of way, division superintendent and general superintendent of the Pennsylvania Railroad, which he served in various capacities for twenty-seven years. He was general superintendent of that company at Harrisburg up quite recently.

Col. W. J. Wilgus and Prof. Burr Consultants to the New York Transit Commission

Col. William J. Wilgus and Prof. William H. Burr have been appointed consulting engineers by the New York Transit Commission to assist and advise the commission's technical staff upon the many engineering problems which will come up in the building of the new lines. Messrs Wilgus and Burr will begin at once a study of the basic plans made by the commission's engineers, and will hereafter work with them in developing the details and deciding upon methods of construction.

Both men are prominent in the engineering world. Colonel Wilgus was formerly chief engineer of the New York Central Railroad, and had charge of the enlargement of terminals, including the now Grand Central Station, and also the change of motive power from steam to electricity. During the war Colonel Wilgus served as deputy director of general transportation of the American Expeditionary Forces in France, with the rank of Colonel in the Army. He did very brilliant work in this connection and was awarded the D.S.M. and made an officer of the Legion of Honor.

Professor Burr has for many years held a leading place among the civil engineers of America. He was consulting engineer for the city of New York in the building of docks and the construction of the new water system. By appointment of President McKinley, he served as a member of the Isthmian Canal Commission to report upon the most feasible route for an inter-oceanic canal, and was reappointed by President Roosevelt. Under Governor Dix, he was appointed a member of the Advisory Board of Engineers for the construction of the New York State Barge Canal. In 1900 he was awarded first place in the national competition for the proposed memorial bridge across the Potomac River at Washington. For several years he was professor of civil engineering at Harvard and Columbia Universities.

Mr. Kressler in Saginaw

New Head of Saginaw Properties Sounds Public Attitude Before Entering Upon His Duties

Charles S. Kressler, president and general manager of the Saginaw Transit Company, which will operate street cars and buses in Saginaw under a franchise granted on June 25, has had twenty-five years' experience in public utility operation. He started with the Detroit United Railway in the power and overhead departments, where he was employed for more than ten years. Mr. Kressler next became connected with the Allis-Chalmers Company, but in 1909, when Alex J. Groesbeck, now Michigan's Governor, and his associates had control of the Saginaw & Flint interurban, he was superintendent of power and overhead. Later when the Michigan Railroad took over the property Mr. Kressler continued with the line as superintendent of overhead.

C. S. Kressler

On Oct. 1, 1913, he went to Manistee as general manager of the electric, gas and street car lines that later were taken over by the Consumers Power Company. Two years ago, however, the railway service there was withdrawn because of the constant loss in revenue. Mr. Kressler remained with the properties at Manistee until the recent organization of Saginaw Transit Company. He was elected president and general manager of the company and is in complete control.

Mr. Kressler knows that he is facing a tough job in Saginaw. Street cars have not been operated there since Aug. 11, 1921, and while the public have come in the meantime to a keen realization of the value of the railway, it is only human to expect that they will be inclined to be critical of the little things. Fully realizing this Mr. Kressler acted accordingly on taking up his duties. He did not fight shy of the local journalists, but he did put them off for a few days on their requests for a portrait of him. This was all part of the man's plan for learning things for himself at first hand, for before his picture appeared in the local press Mr. Kressler traveled over the city incognito visiting all sections to learn at first hand the reaction of the public to the incoming railway administration and to gain some knowledge of where, in the opinion of the public, the previous railway administration had been guilty of either sins of omission or of commission that had worked against it with the public.

Just as soon as he had completed this personal survey Mr. Kressler released his portrait for publication. In not a few instances it was at once recognized by many as that of the man who had interviewed them on one phase or another of the local transportation problem, but nowhere was there any evidence of resentment over the fact that Mr. Kressler had not previously disclosed his identity.

Mr. Kressler says: "You must sell yourself and service to the public. Since I have been in Saginaw I have been studying conditions and I believe I know first hand what the people want and I am going to give them what they want if it is possible to do so."

Fred E. Mathews has replaced J. L. Hale as chief dispatcher of the Winona Interurban Railway, Warsaw, Ind. Mr. Hale's unfortunate death was referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 15, 1923.

E. A. Aspnes, president, general manager and purchasing agent of the Waupaca Electric Service Company, has severed his connections with that company. James Richardson has been appointed in the capacity of vice-president and general manager.

William M. Quackenbush, general superintendent of the Rapid Railway System, Port Huron, Mich., has resigned after twenty-seven years with the system. He started in a minor capacity and rose through intervening posts until he became superintendent twelve years ago.

Paul Shoup, vice--president of the Southern Pacific Company; president of the Pacific Electric Railway, Los Angeles, and an officer in many other companies under Southern Pacific control, has been made a director of the Anglo & London-Paris National Bank, San Francisco.

Clark R. Jackson, former State Tax Commissioner, has been appointed by Mayor E. J. Brown superintendent of Public Utilities of Seattle, Wash. The appointment has been approved by the City Council. Mayor Brown states that he expects the new superintendent, aside from running his own department, to make a survey of the light, railway and water departments looking toward a valuation of the properties.

James Dalrymple, general manager Glasgow Corporation Tramways, who has been in this country on an extended visit, planned to return on Oct. 20. After attending the Atlantic City convention Mr. Dalrymple spent the last week of his visit in New York. Just before leaving he said that the electric railways as a whole have made great advances since he had visited America in 1913 and that he had found much to interest him on his trip.

Enrich G. Elg has resigned from the Chicago Surface Lines to become office and sales engineer on copperweld wire and other products of the Copper Clad Steel Company for the Steel Sales Corporation, Chicago. While with the Chicago Surface Lines, Mr. Elg had charge of tests in the shops and equipment division and was associated in new car construction. Previous to this, he was operating engineer of the Decatur Railway & Light Company, an Illinois Traction property. Mr. Elg is a graduate of the school of electrical engineering, University of Illinois.

Alvin Coffman, formerly claim agent of the Chicago & West Towns Railway, Oak Park, Ill., resigned this position on Sept. 15. Mr. Coffman became identified with electric railway work in Roanoke, Va., where he served as superintendent of transportation and claims agent for a number of years of the Roanoke Railway & Electric Company. Later he conducted a joint claim adjusting bureau in Dayton for the City Railway, the People's Railway and the Oakwood Street Railway. It was from the service of these companies in Dayton that he resigned to engage in war work. He is a native of Philadelphia.

Obituary

Benjamin B. Foss, retired superintendent of the Lynn division of the Eastern Massachusetts Street Railway, died recently at his home in Lynn. He was born in East Parsonfield, Me., fifty-eight years ago. He entered into the employ of the Boston & Lynn Street Railway as a motorman in the year 1898.

William L. Cosgrove, Atlanta, for many years prominently identified with the Georgia Railway & Power Company as an engineer, and at one time president of the Atlanta Gas Light Company, a subsidiary organization of the power company, died Oct. 8 in a hospital at Kent, England, according to cable information received in Atlanta. Mr Cosgrove, with his wife, had been traveling in Europe for the past two years, and about a month prior to his death he was stricken with apoplexy. He was sixty-four years of age. He retired from active business life about five years ago.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Japan Will Spend Several Million Dollars for Electrical Equipment

Although it is impossible at the present time to obtain complete information concerning the extent of the destruction of electric railway property in Japan, nevertheless from inquiries received by manufacturers in the United States it is evident that much material will be needed to restore them to their former operating efficiency. Inquiries have been received for about 300 trucks and underframes for single-truck cars. It has been the practice in the past for Japan to import trucks and motors largely from the United States and to build the car bodies locally in Japan. This method will presumably be followed in replacing the cars destroyed by the recent disaster. Inquiries for upward of 500 electric motors for railway service have also been received. These, together with the trucks already mentioned, will constitute the essential equipment for several hundred cars. It is thought, however, that the total number destroyed will be found larger than that and apparently this is only the first step in the program of restoration.

The Westinghouse Electric International Company has already received orders for electrical apparatus to be used in reconstruction work in Japan totaling more than $1,000,000. Other orders in course of negotiation will bring the total amount to approximately $2,000,000. According to the latest information the power plants in the earthquake zone were not seriously damaged, but the distribution systems were practically destroyed.

Improvement Noted in G. E. Orders

The General Electric Company received orders amounting to $65,483,549 during the quarter ended Sept. 30, according to a recent announcement of the company. This compares with $58,914,620 in the corresponding three months of 1922. Orders for the first nine months of this year were $229,747,304, compared with $176,171,194 in the same period of 1922.

Gas Manufacturers to Co-operate with Welding Schools

The Gas Products Association, whose headquarters are at 140 South Dearborn Street, Chicago, Ill., recently appointed an educational committee to co-operate with trade and technical schools in supplying a practical and standard course in welding procedure. Many users of oxyacetylene welding equipment have not been entirely satisfied with the work done in the past by welding school graduates. At the same time the application for the welding processes has been extended to so many new fields that the demand for skilled operators is constantly increasing. It is thought therefore that by making a thorough investigation of the needs of the industry and then making recommendations to welding school instructors, the instruction programs can be revised and standardized so as to more fully meet the requirements of the employers.

Steel Prices Are Steady

According to information recently published by the Department of Commerce there has been little change in the price of iron and steel during the past three months. The present figures are somewhat higher than in the latter part of 1921 and in 1922, but far below those of 1919 and 1920. The weekly average price of iron and steel composite for the past five years was as follows:

	Per Ton
1919—Weekly average	$50.37
1920—Weekly average	65.60
1921	
First quarter, weekly average	48.72
Second quarter, weekly average	43.01
Third quarter, weekly average	36.49
Fourth quarter, weekly average	34.72
1922	
First quarter, weekly average	33.09
Second quarter, weekly average	36.00
Third quarter, weekly average	40.32
Fourth quarter, weekly average	42.19
1923	
First quarter, weekly average	42.90
Second quarter, weekly average	46.90
Third quarter, weekly average	44.85
Week ending	
July 7	45.49
July 14	45.26
July 21	45.09
July 28	44.97
Aug. 4	44.88
Aug. 11	44.84
Aug. 18	44.84
Aug. 25	44.84
Sept. 1	44.68
Sept. 8	44.72
Sept. 15	44.70
Sept. 22	44.47
Sept. 29	44.23

Metal, Coal and Material Prices

Metals—New York	Oct. 16, 1923
Copper, electrolytic, cents per lb.	12.875
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.85
Zinc, cents per lb.	6.625
Tin, Straits, cents per lb.	41.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.675
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons.	1.35
Central, Ill., screenings, Chicago, net tons	.825
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.98
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$1.01

Rolling Stock

Princeton Power Company, Princeton, W. Va., has purchased four all-steel cars.

Detroit United Railway has ordered from the St. Louis Car Company ten all steel passenger interurban cars. The cars are of the same type as the ten ordered by the Indiana Service Corporation.

Tygarts Valley Traction Company, Grafton, W. Va., will receive two cars from J. G. Brill Company of Philadelphia. The secretary of state of West Virginia authorized the leasing of the cars to the company for an initial payment of $3,245 and the payment of three like sums within the next ninety days.

Illinois Power & Light Corporation, Chicago, Ill., has completed plans for building six new 80 ton, all steel, electric locomotives, 1,000 hp. each, at the Decatur, Ill., shops of the Illinois Traction System. The cost of the new equipment will be approximately $180,000. It will be used for hauling freight cars and bring the total number of electric locomotives of the system up to thirty-six.

Track and Line

Georgia Railway & Power Company, Atlanta, Ga., has been granted permission by the City Council to extend its tracks on Highland Avenue, a distance of more than 2⅓ miles from the present terminus at Virginia Avenue.

New York, N. Y.—The Transit Commission recently announced that it had awarded the contract for the extension of the Fourth Avenue subway, Brooklyn, from its present terminus at Eighty-sixth Street to Ninety-sixth Street, Fort Hamilton, to the T. A. Gillespie Company, at the figure of $1,725,884. Bids were received by the commission on Oct. 2. The Gillespie Company was the lowest of six bidders.

Princeton Power Company, Princeton, W. Va., is planning the construction of a sidetrack on Princeton Avenue, just west of the intersection of Black Street for the operation of cars from Graham, Va., to the Bluefield fair grounds without the necessity of transfer. Another switch is to be constructed between Hale's crossing and the state line. The company is considering the question of looping both Bluefield and Graham with a belt line.

Power Houses, Shops and Buildings

Northern Ohio Traction & Light Company, Akron Ohio. expects to link up with the super-power lines of the Cleveland Electric Illuminating Company. Work on the connection is progressing rapidly and it is expected that the new supply will be available within the next few months.

Chicago, North Shore & Milwaukee Railroad, Milwaukee, is arranging to erect an addition to its present freight station which it now operates in conjunction with its street railway terminal at Sixth and Sycamore Streets. The cost of this new addition will be $16,800.

Boston Elevated Railway is demolishing the remaining portions of its carhouse at Neponset which was damaged by fire months ago. The trustees of the company propose to build no more carhouses at present. The company will, however, build some inspection sheds large enough to cover hundreds of cars should it be found necessary. With this idea of outside or field storage of cars in view the Elevated officials are making substantial progress at Lotus Place in providing a modern yard layout to care for cars now using Jamaica Plain and old Lotus Place (Forest Hills) carhouse. There are now 177 cars at these stations and the new layout will care for 290. Jamaica Plain station is to be abolished. The land will be sold. Work is underway on the development of a modern yard at Salem Street, Medford station. The carhouse there is rapidly being demolished. Rapid progress is also being made at the Everett repair shops. The contract calls for the completion of the new shops on Oct. 26. The Boston Elevated expended $1,027,614 on this unit up to June. The development comprises twenty-five acres.

Trade Notes

L. B. Breedlove will act as consulting engineer to the bond department of the Chicago Trust Company. He will advise in the analysis of public utilities and industrial properties in the financing of which the bank is interested.

Western Electric Company, New York, N. Y., announces that the general sales offices of its supply department is located in the Pershing Square Building, 100 East Forty-second Street. Herbert Metz has been appointed advertising manager.

Detroit Stoker Company announces the appointment of E. L. Beckwith as district manager in charge of the Chicago office, address Illinois Merchants Bank Building, 230 South Clark Street. Mr. Beckwith is an engineer with many years experience in stoker sales work.

Newhall Company of Ohio has filed a certificate of incorporation in the office of the Secretary of State. The corporation, capitalized at $50,000, will engage in railroad construction work. Samuel B. Botsford, 925 Fidelity Building, Buffalo, is named as agent. R. M. Morgan of 1306 Williamson Building, Cleveland, is attorney.

P. W. Wood has moved his office to 1003 Carondelet Building, New Orleans. Mr. Wood is the Southern agent for the Buda Company, Railway Track Work Company, American Cable Company, and has recently been appointed agent for the Witherow Steel Company. In addition to handling these accounts, he also does a general business in track material of all kinds.

Link-Belt Company, Chicago, announces the purchase of the Meese & Gottfried Company, San Francisco, Los Angeles, Seattle and Portland. The improvement in distributing facilities effected by the consolidation, and the additional manufacturing facilities acquired should give the rapidly-growing industries of the Pacific Coast highly economical and efficient service. It is the intention of the new owners to add to the facilities and enlarge present stocks, so that prompter service to its customers will be insured. The new organization will be known as the Link-Belt Meese & Gottfried Company with headquarters at San Francisco. The officials include Charles Piez(chairman of the board; B. A. Bayman, president; Harold H. Clark, vice-president and sales manager; Leslie W. Shirley, treasurer, and Richard W. Yerkes, secretary.

New Advertising Literature

Johns-Pratt Company, Hartford, Conn., has recently issued new catalogs on the Noark service boxes and the Noark universal service switches.

Reliance Electric & Engineering Company, Cleveland, Ohio, has issued bulletin No. 2014, descriptive of Type T Reliance motors for direct-current circuits.

Heine Boiler Company, St. Louis, Mo., has issued a circular describing the two boilers installed within the past two years in the plant of the Cambridge Electric Light & Power Company at Cambridge.

Hisey-Wolf Machine Company, Cincinnati, Ohio, has issued bulletin No. 1305, with illustrations, describing in detail the company's full line of new and improved two-wheel floor and bench grinders.

Combustion Engineering Corporation, New York City, has issued bulletin CB2, describing the Coxe traveling grate stoker. Typical evaporative tests of this stoker with various types of boiler are tabulated.

Mitchell Rand Manufacturing Company, New York, N. Y., has published a handbook called "Everything in Insulation." This book, of 160 pages, is printed on beautifully calendered paper, well illustrated, sewed and bound in a cover of flexible Spanish leather. It is written in words that the man in the shop can understand and put into practice in his daily work. Among the subjects treated are the selection of insulation varnishes, paper and wood as insulators, electrical insulating paints, etc. Compounds of every description for waterproofing, insulating, electrotyping, impregnating, filling, sealing, etc., are described in detail.

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POWER off! Air gone! Car drifting down grade and getting out of control! Will the hand brake stop it? It ought to. That's what it's there for.

But—there have been cases where the motorman struggled desperately with the hand brake and found it wouldn't work. Analyze such cases and you'll frequently find that some inadequate hand brake wound up all the chain it could hold—and then stuck before the brake shoes reached the wheels.

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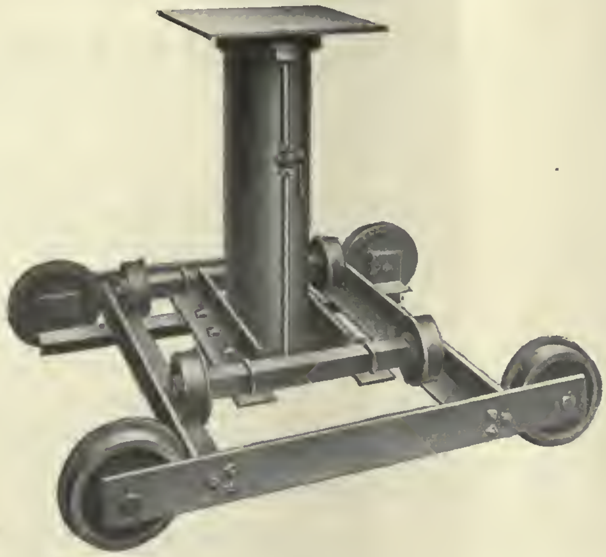

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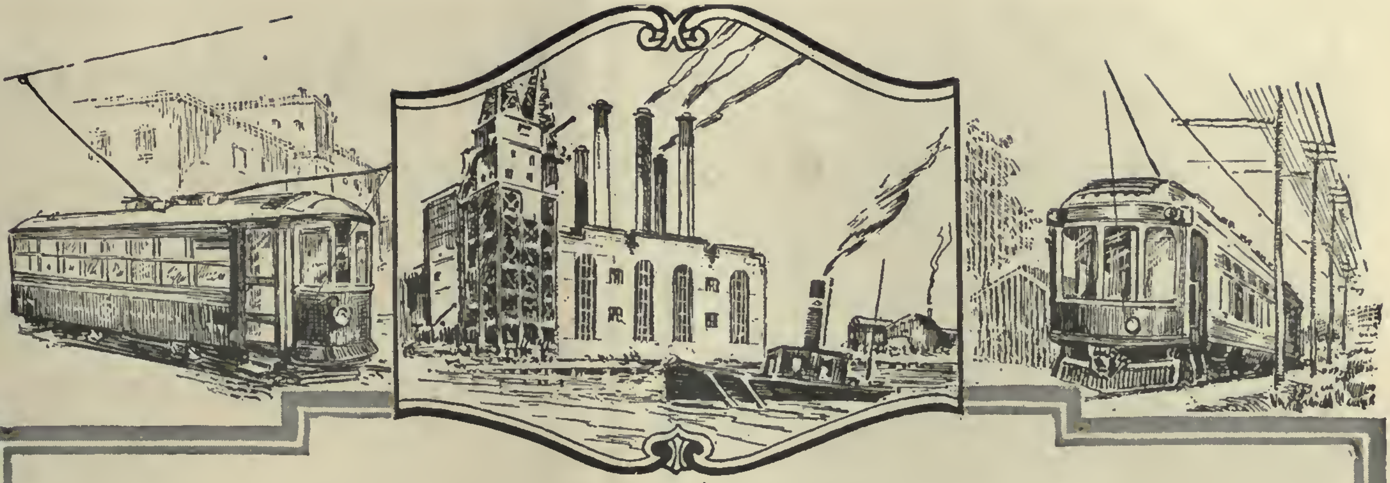

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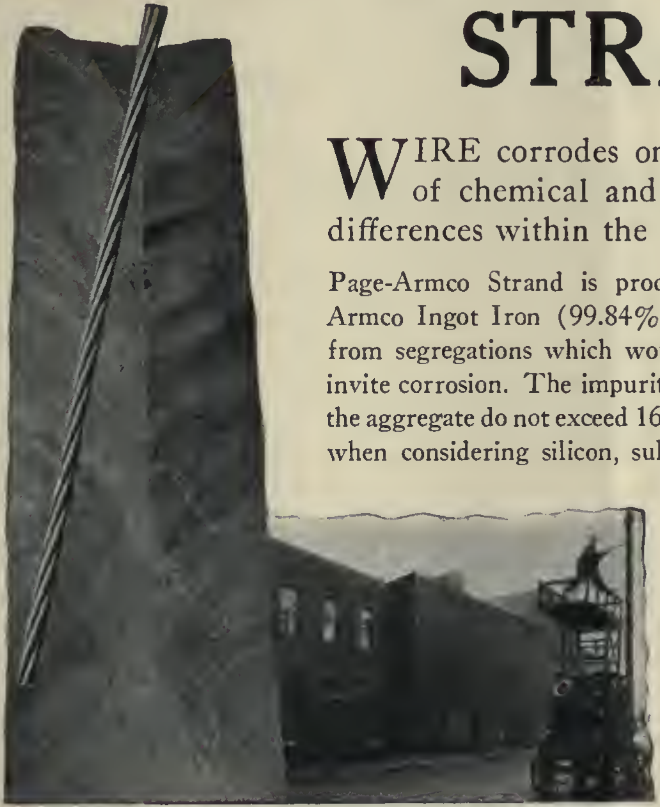

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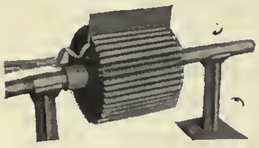

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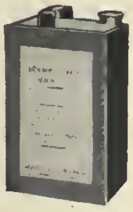

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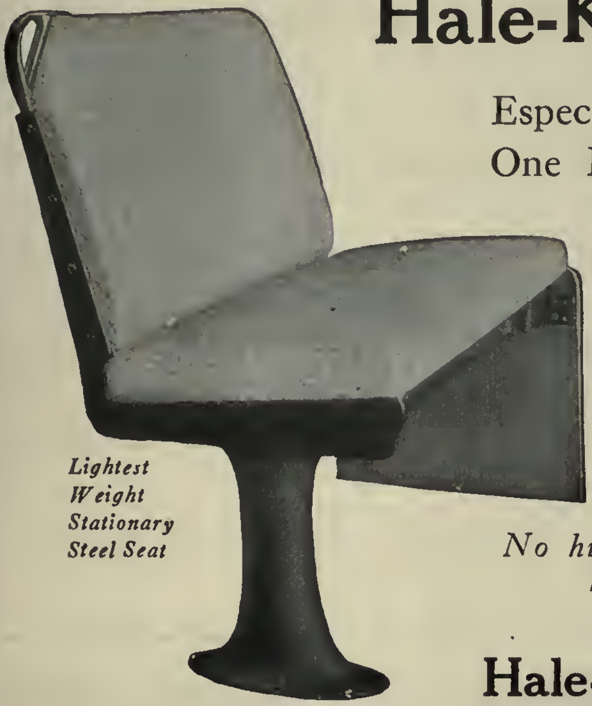

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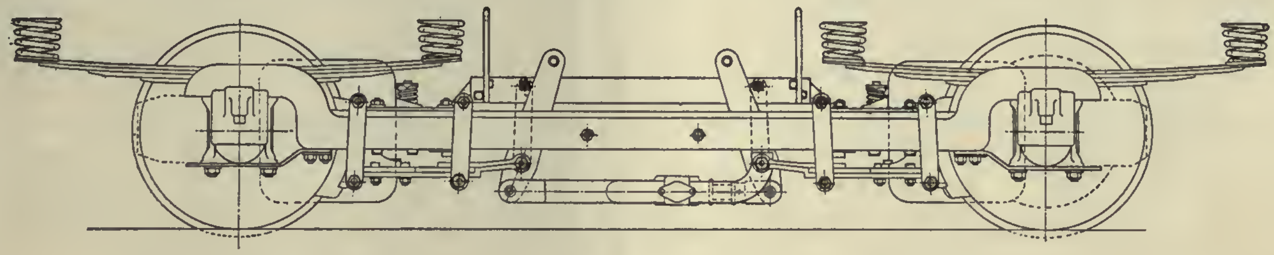

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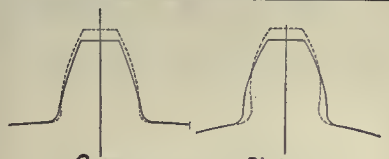

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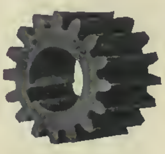

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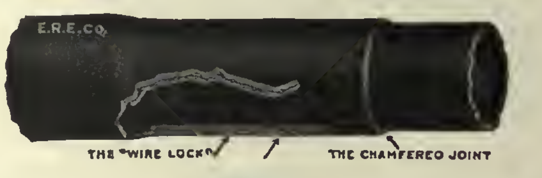

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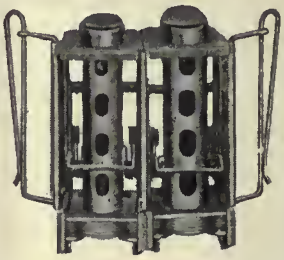

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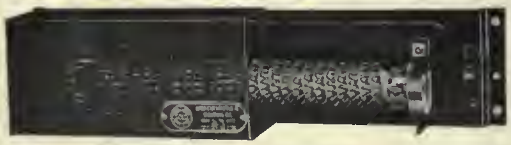

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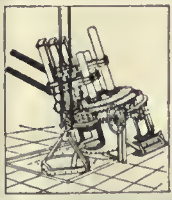

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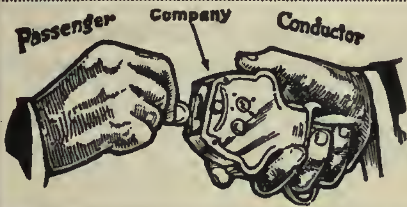

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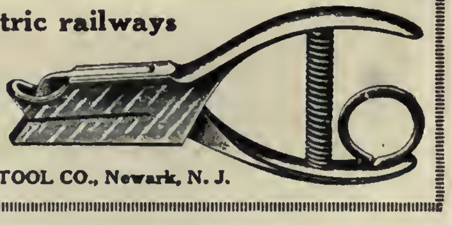

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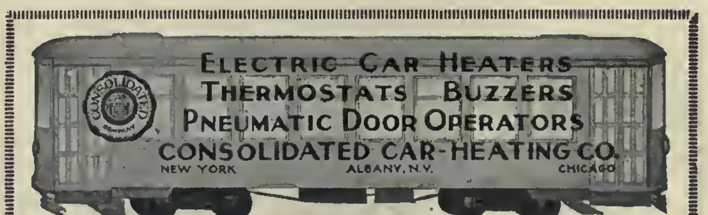

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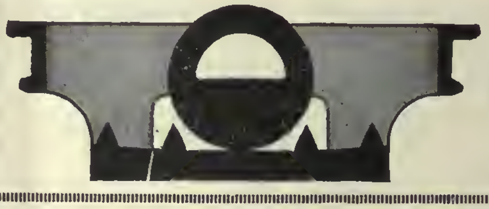

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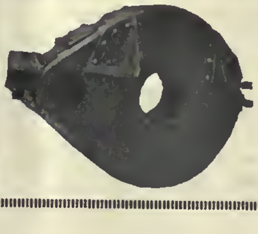

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Elec. Service Supplies Co.
Ohio Brass Co.
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General Electric Co.
Westinghouse E. & M. Co.
Controller Regulators
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General Electric Co.
Westinghouse E. & M. Co.
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Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
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Anaconda Copper Mining Co.
Cord, Bell, Trolley, Register,
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co., The
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
Couplers, Car
Brill Co., The J. G.
Gould Coupler Co.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.
Cranes
Allis-Chalmers Mfg. Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tie Co.
Crossings
Ramapo Ajax Corp.
Crossing Signals (See Signals, Crossing)
Crossing, Frog & Switch
Wharton, Jr., & Co., Wm.
Ramapo Ajax Corp.
Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Crossings, Track (See Track, Special Work)
Crossings, Trolley
Anderson Mfg. Co., A. & J.M.
Ohio Brass Co.
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Buffalo Housewrecking Co.
Elec. Equipment Co.
Hyman, Michaels
Levis Co., Henry
Transit Equip. Co.
Derailing Devices (See also Track Work)
Wharton, Jr., & Co., Wm.
Derailing Swiches, Tee Rail
Ramapo Ajax Corp.
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Wish-Service, P. Edward
Doors & Door Fixtures
Hale & Kilburn Corp.
St. Louis Car Co.
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Brill Co., The J. G.
Consolidated Car Heati'g Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
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Nat'l Pneumatic Co., Inc.
Drills, Rock
Ingersoll-Rand Co.
Drills, Track
Amer. Steel & Wire Co.
Elec. Service Sup. Co.
Ingersoll-Rand Co.
Ohio Brass Co.
Dryers, Sand
Elec. Service Supplies Co.
Ears
Anderson Mfg. Co., A. & J. M.
Ohio Brass Co.
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Amer. Electrical Works
Roebling's Sons & Co., J. A.
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Railway Track-work Co.
Electrodes, Carbon
Railway Track-work Co.
Electrodes, Steel
Railway Track-work Co.
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Beckwith-Chandler Co.
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Arnold Co., The
Beeler, John A.
Bibbins, J. Rowland
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Byllesby & Co., H. M.
Day & Zimmerman, Inc.
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Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelly Cooke & Co.
Ong, Joe R.
Richey, Albert S.
Sanderson & Porter
Sangster & Co., A.
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.
Wortham, Edwin
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Cleveland Fare Box Co.
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Bethlehem Steel Co.
Ramapo Ajax Corp.
Frogs, Track (See Track Work)
Frogs, Trolley
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Ohio Brass Co.
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Wharton, Jr., Inc., & Co. Wm.
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Guards, Trolley
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Railway Track-work Co.

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Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Kerite Insulated Wire & Cable Co.
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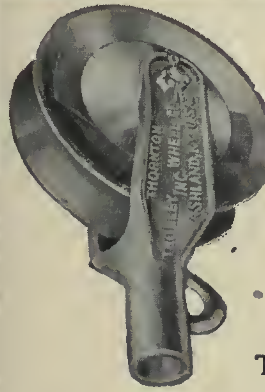

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Mr. Bickle, Chief Motor Inspector of the Louisville Railway Company, says: "All of the Thornton Side Bearings we have tried out are still in use and in fine condition. Some of them have made close to 50,000 miles and it looks like they might make more than double that mileage before we have finished the test."

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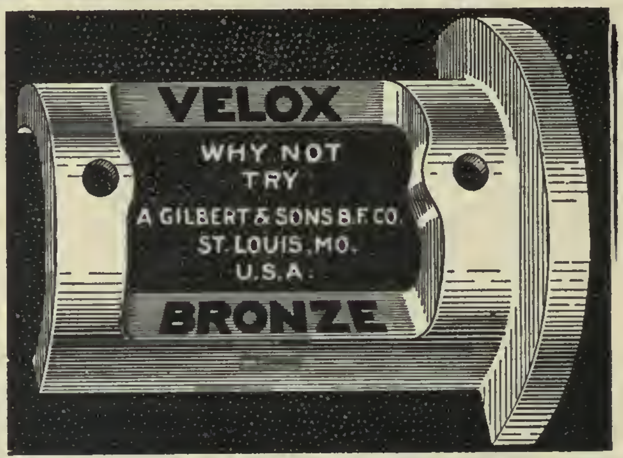

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Ackley Brake & Supply Corp'n
50 Church St., New York

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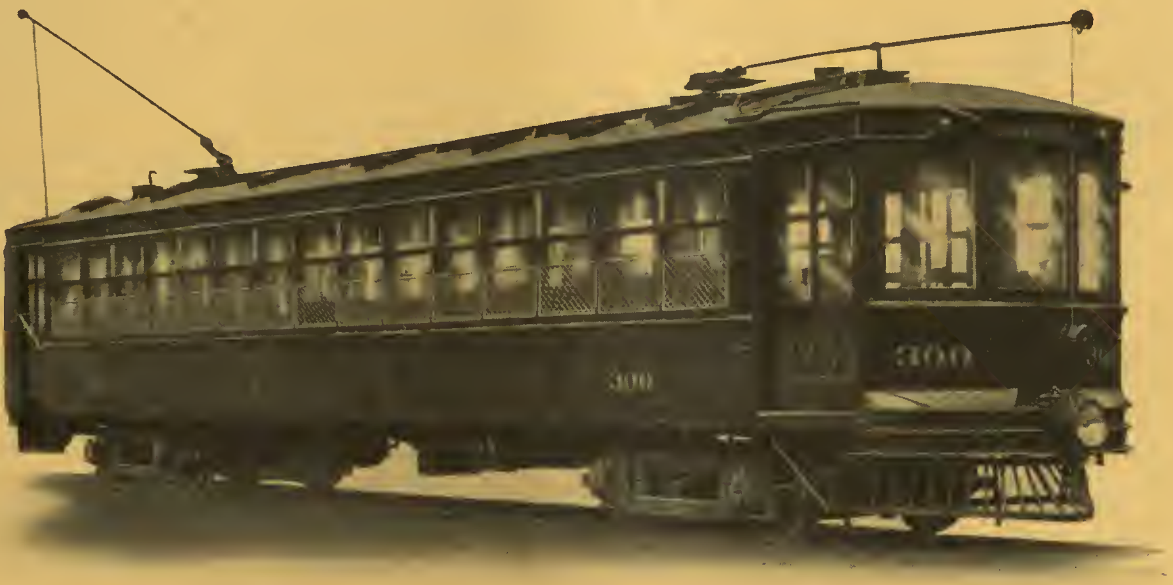
Indiana, Columbus & Eastern Traction Co's New Cars



Combination Passenger, Smoking and Baggage Interurban Type

Mounted on Brill 27-MCB-2X Trucks

Although much lighter in weight than other types in service on the same road the six new interurban cars to be shortly placed in service by the Indiana, Columbus & Eastern Traction Co. are substantially built and capable of meeting the high speed service requirements with satisfaction to both management and passengers.

While designed for single-end operation, these new cars are so equipped that they can be operated in either direction in emergencies. Total seating capacity, 58.

Complete details of construction and equipment included in the October issue of Brill Magazine

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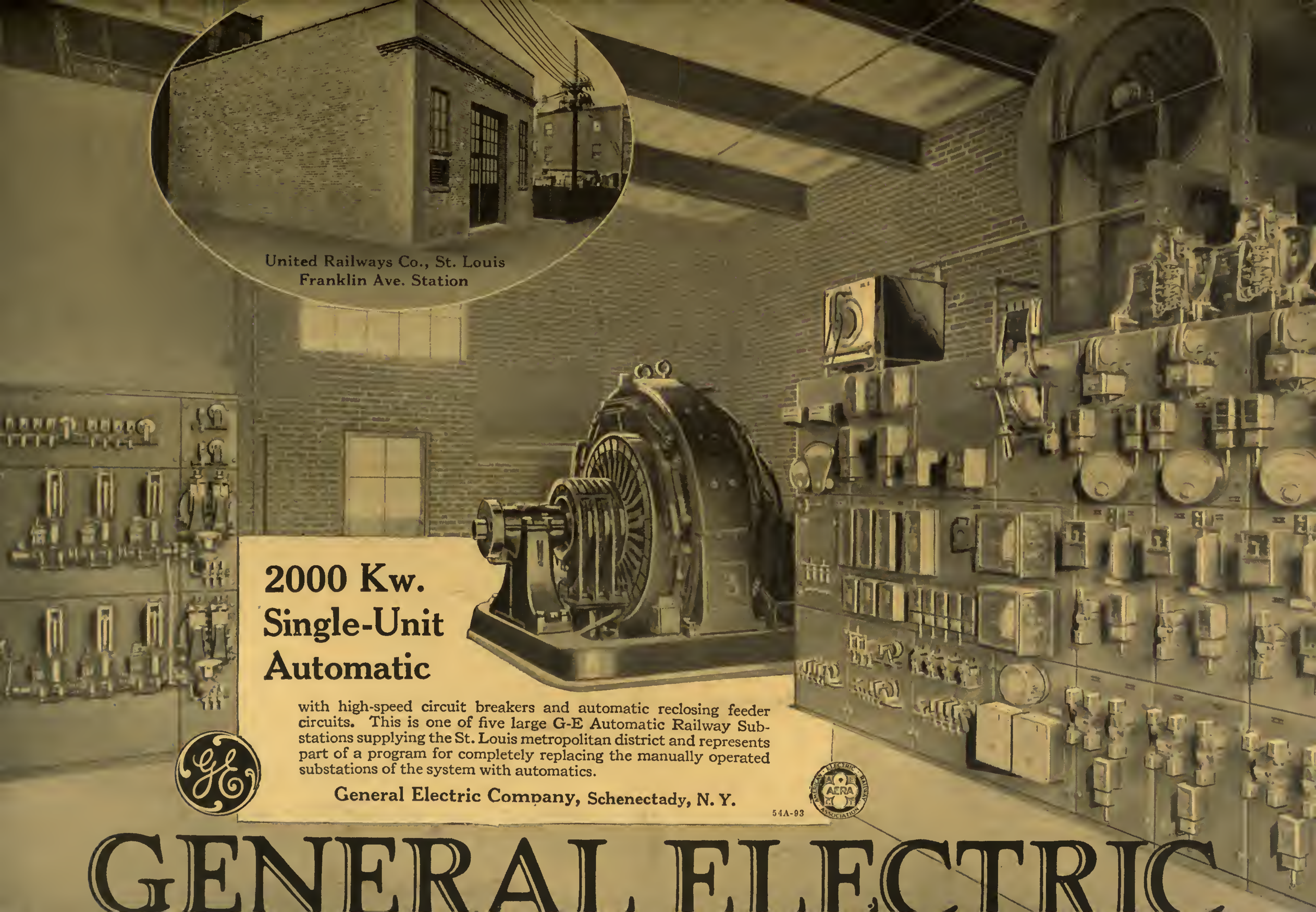

United Railways Co., St. Louis
Franklin Ave. Station

2000 Kw. Single-Unit Automatic

with high-speed circuit breakers and automatic reclosing feeder circuits. This is one of five large G-E Automatic Railway Substations supplying the St. Louis metropolitan district and represents part of a program for completely replacing the manually operated substations of the system with automatics.

General Electric Company, Schenectady, N. Y.

54A-93

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ELECTRIC RAILWAY JOURNAL

October 27, 1923

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W
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Is Your Present Rolling Stock Economical?

One of the most prominent executives in the Electric Railway Industry recently made the following statement:

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Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

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Westinghouse

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Purchasing Department

WE HAVE had to interrupt our inspection trip through the McGraw-Hill plant because of our attendance at the American Electric Railway Association convention in Atlantic City. Let us get together again and look over our Purchasing Department.

Here another big job is being done under able management. Orders for every commodity purchased by the McGraw-Hill Company must go through this centralized department. These orders come from both the mechanical and office departments and include such commodities as paper, ink, stationery, furniture, building and machinery equipment. In addition, any outside requirements for the company or for any of its publications must pass through the hands of this department.

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Published weekly
Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879.
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—a safety panel for the control of lighting, heating and air circuits.

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—a panel with a cover over the "air" switch necessitating special effort to operate this switch, thus preventing the accidental operation of the "air" switch instead of the "heat" or "light" switch. Such protection is prescribed by law in some states and is advisable everywhere.

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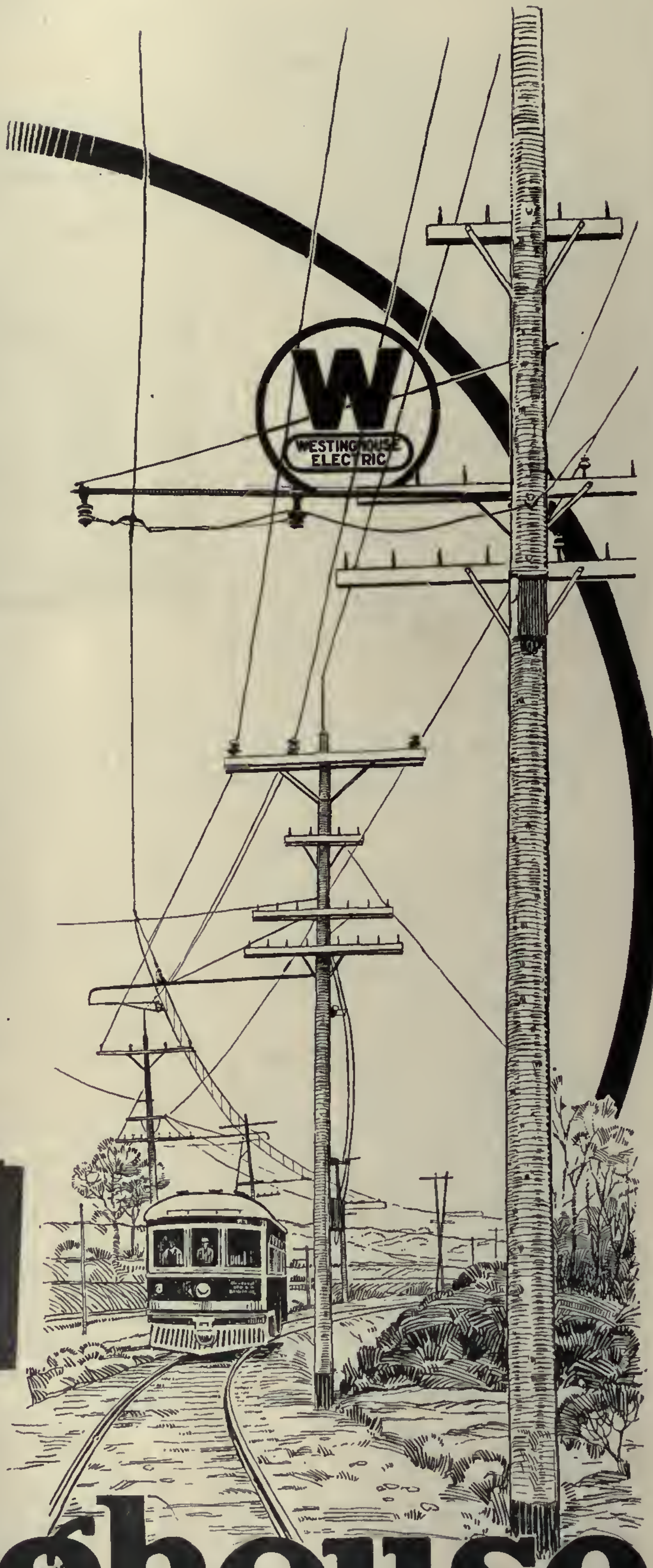
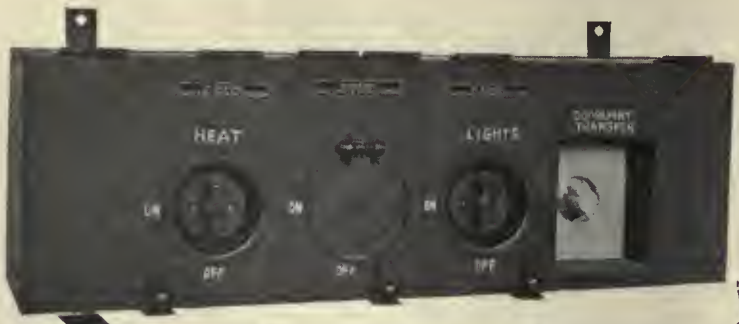
For complete information, write to our nearest district office, or to

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania





Westinghouse Safety Panel for Electric Cars

Westinghouse

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When you plan 1924 paved track and face the present high cost and shortage of prime quality wood ties, think of the 26 properties which made their first installation of steel twin ties in 1923.

To determine whether you can do better on cost of track with steel twin ties ask for itemized costs and track plans on Twin Tie Track.

The
INTERNATIONAL
STEEL TIE CO.
Cleveland

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TROLLEY B CATCHER
B
B

For BROOKLYN

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Trolley Bases
Headlights
Trolley Catchers
Sand Traps

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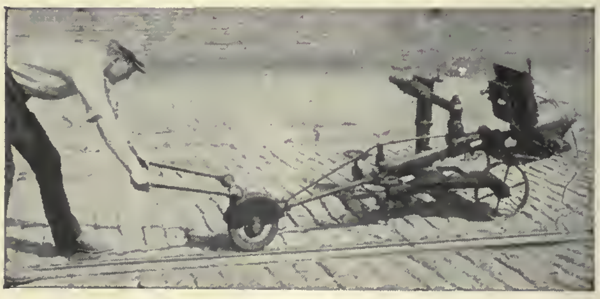

"Hercules" Rail Grinder

You cannot tell Mr. Fred W. Sweeny much about electric railway accounts. He's Chief Examiner of Accounts, Interstate Commerce Commission. In his introductory letter to the well known book entitled "Classification of Accounts for the use of Electric Railways" Mr. Sweeny calls particular attention to Account No. 25—"Depreciation of Way and Structures." Elsewhere the famous book refers to the time when track may have only "scrap value."

The engineering significance of the relation between these two subjects is clear to electric railway men who realize that corrugated rails, cupped joints and battered special work hasten the day when not only the rail but the whole track structure becomes "scrap."

Timely welding and grinding cheaply and surely put off the evil day, meanwhile also preserving car-life and passenger comfort.

Bulletins describing the accepted equipment are yours for the asking.

Railway Track-work Company

3132-48 East Thompson Street, Philadelphia

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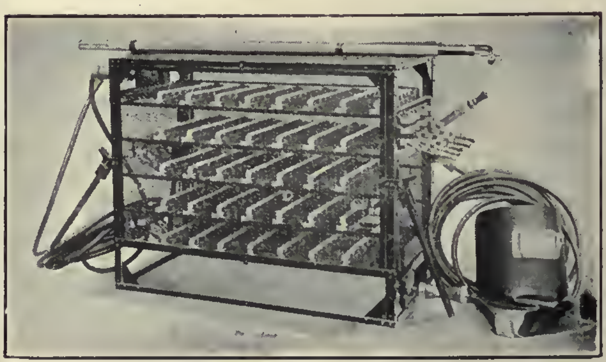
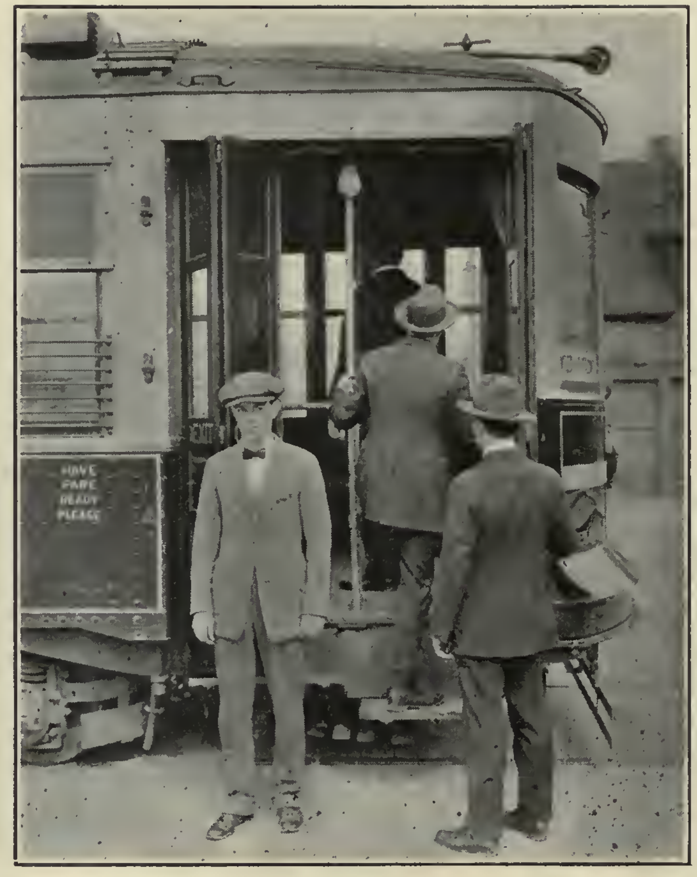


"Ajax" Electric Arc Welder

Look ⟶

This exit door is closing itself!



NATIONAL PNEUMATIC EQUIPMENT

on the "Automatic Door" Car

As the last outgoing passenger leaves the step, the automatic exit door closes itself. Incoming passengers, using the entrance door only, are completely separated.

Free and unimpeded passenger interchange is secured without barriers in the passageways. Fare collection safeguarded, and length of stops shortened. Selective door control provided. National Pneumatic Equipment throughout on Chicago's double-truck one-man *automatic door cars.* Just another example of National Pneumatic co-operation in progress improvement and efficiency.

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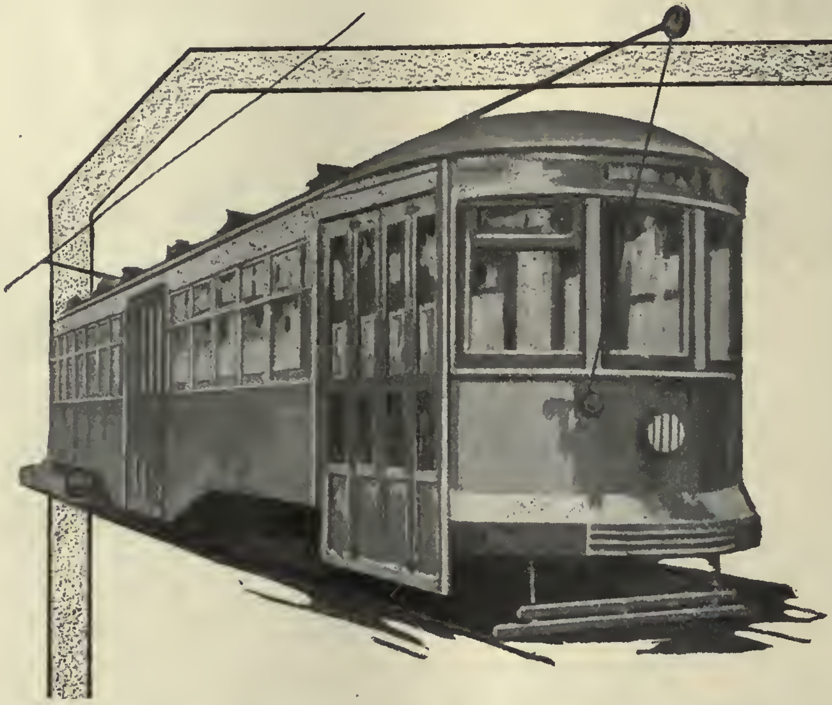

Those 200 New SAFETY CARS for Brooklyn

Like hundreds of other cities, large and small, Brooklyn has found the most satisfactory solution of its transit problems to be the Safety Car.

Hence the recent order of the Brooklyn City Railroad Company, which will add 200 cars of this type to the many others previously placed in service there.
Safety Cars give *universal satisfaction*.

WE FURNISH THE EQUIPMENT

We furnish the Safety Car Control Equipment which makes *any* car a Safety Car — the equipment specified for the 200 new Brooklyn cars and for 9,000 others of the "Safety" type in service on 400 other properties.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
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IN SEATTLE

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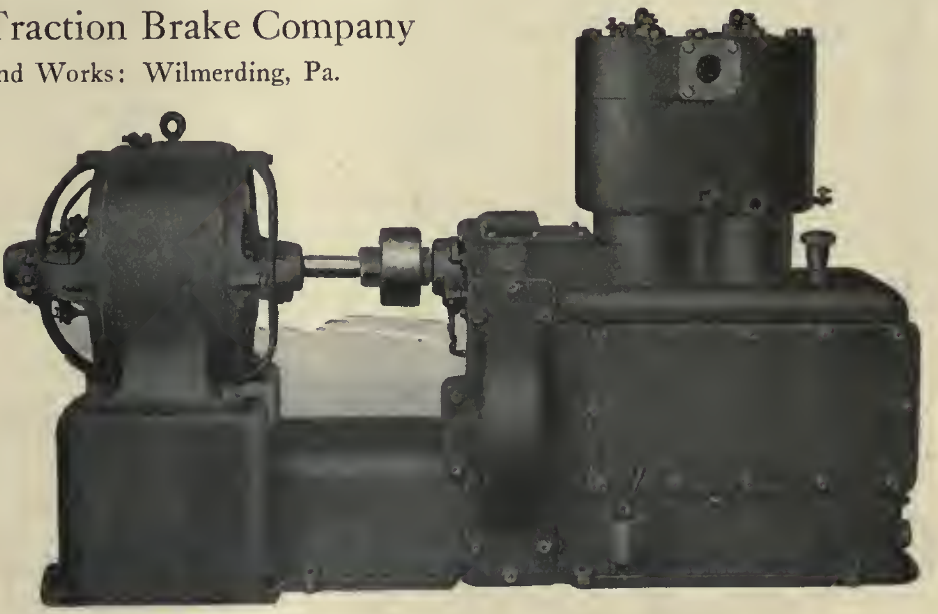
You, too, can Economize!

COMPRESSED air can be employed for innumerable operations which are slow and costly when performed by hand. Westinghouse-National Industrial Air Compressors are built to meet every need of the electric railway field, and the satisfactory service which they invariably give has become a matter of tradition. The highest degree of economy is attained in the general plan of design and especially in the distinctive feature of Automatic Control. All types and sizes. Write today.

Westinghouse Traction Brake Company
General Office and Works: Wilmerding, Pa.



Westinghouse Type E-4 Compressor with Thermo-Syphon Cooling System

WESTINGHOUSE—NATIONAL
Air Compressors

"QUALITY MACHINES FOR QUALITY SERVICE"

Now is the Time To Contract for 1924 Ties

SAVE time, money and worry! Here's how you can do it. The International Company has developed an organization for the production and merchandising of ties according to a definite policy and system, whereby standard, high grade ties can be delivered to you subject to your inspection at the point of delivery.

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Just specify the kind of timber and the grade—and you will get exactly what you specify—Our I. C. C. Co. Dating Nail will prove that. Send inquiries to our general office at Galveston.

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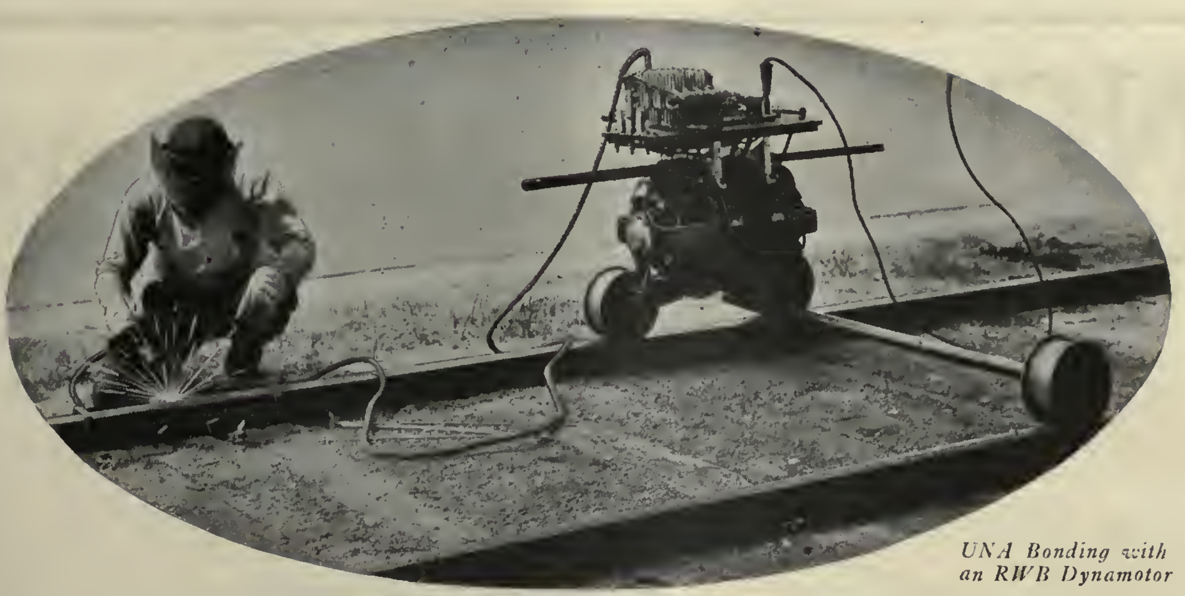

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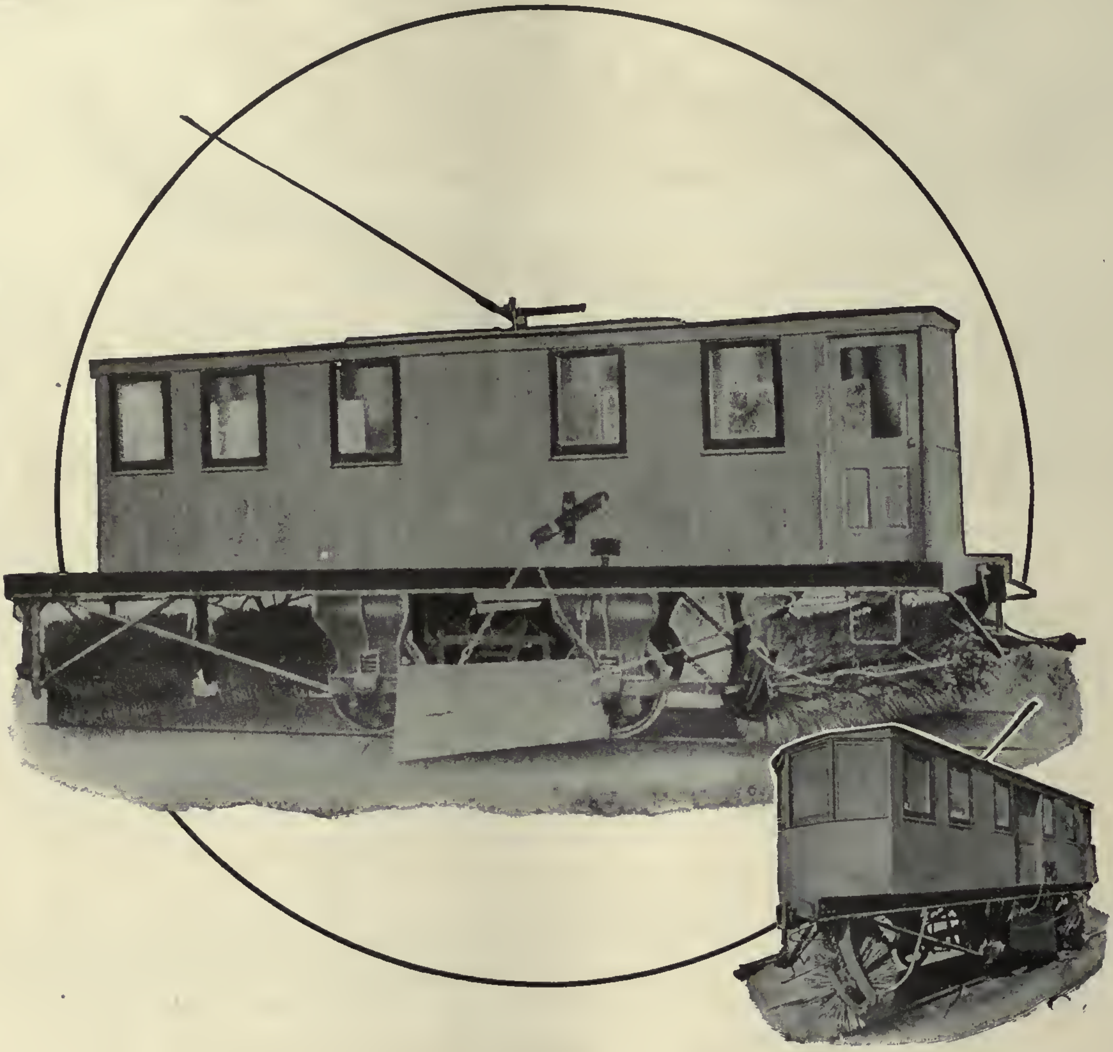

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 62
Number 17

Efficient Arrangement of Machine Tools Goes Hand in Hand with Modern Machines

WHEN costs of turning steel wheels are compared, as in this issue, in the second survey article on wheel, gear and axle practice, a great variation is found. This is because the time required to turn a pair of steel wheels and the resulting cost of the operation depend on several factors. These include the skill or efficiency of the workman, the adequacy of the wheel lathe, condition of the cutting tools, the handling devices provided for getting the wheels to and into the lathe, the arrangement of the shop, layout of machines, convenience of storage space, and finally the condition of the wheels to be turned.

In general, the machine tool equipment for wheel and axle work is good only here and there in electric railway shops. A few railways have installed new wheel lathes or boring mills. Others have overhauled old tools and rearranged their shops to increase output. In all of these shops a marked improvement has resulted. By installing a new wheel lathe, using high-speed tool steel, and increasing the cutting speed, one road is taking care of wheel turning with two men where nine were used previously. The saving in labor alone will pay for the initial investment in two years.

Another shop had an excellent wheel lathe of late type, but the handling devices were entirely inadequate. The space for bringing wheels to and taking them away from the lathe was so cramped that one operation interfered with the other. Wheels were allowed to accumulate around the lathe to such an extent that the work of getting wheels into and out of the lathe was hindered. Furthermore, very little attention was being given to the quality and condition of the cutting tools, so that the lathe was operated at a slow speed. At this shop one machinist and a helper turn from eight to ten pairs of wheels in an eight-and-one-half-hour day, while at another shop, equipped with the same type of wheel lathe, but where particular attention has been given to handling devices, machine location and cutting tools, a man and a helper turn from sixteen to eighteen pairs of wheels in nine hours.

Railway shopmen are anxious to make a good record, and they work to that end when sufficient attention is given to the matter of tools and working conveniences, and to training of the men in modern shop methods. In the case just given, the output obtained from a $22,000 investment was only 50 per cent of what it might have been with proper handling equipment and sufficient space for doing the work, which could have been provided for an additional investment of less than $2,000.

Better cutting tools will prove a good investment. There is little use in spending money for an up-to-date wheel lathe unless the tools used on it will allow the machine to be operated at its full capacity. Tool grinders were found in most of the shops visited in making this survey, but there was a wide variation in the way tools were ground. Even in the same shop, different machinists had different ideas of the angle, clearances and rake to be given tools, and they insisted on the tools they used being ground in accordance with their own ideas. By determining the best practice and making this uniform, much can be gained.

Modern machine tools applied to railway shop work are capable of economies that managements should know about. Improvements in present machines and their location in an effective plan should be considered, for in many cases good savings can be effected by this means, although this may be considered a substitute for a better plan, namely, new tools.

The Engineer in the Equipment Department

IN THE recent Annual Convention Number of the JOURNAL reference was made to the necessity for properly trained engineering organizations in the equipment departments of electric railways. It was pointed out that such an organization is necessary for the formulation and maintenance of company standards, and that through such work it can effect large economies by cutting down repair part stocks and eliminating costly maintenance delays.

Even on the larger electric railways there are very few instances where such engineering organizations have been developed to a degree warranted by the importance of the work to be done. On many properties the engineer in the rolling stock organization is entirely engaged in the work of preparing drawings for either new car construction or repair work. On other properties he is entirely occupied in experimental work. His work is frequently looked on as of a rather minor nature and he is frequently a comparatively young and inexperienced man who is willing to accept the compensation offered in order to broaden his experience.

Even these initial steps in the formation of an engineering division are to be commended, for there are too many instances on properties of considerable size where all development as well as routine maintenance is carried out entirely by shop foremen or mechanics under only the general supervision of the department head. In the interest of what is considered economy, very few drawings of any kind are prepared by the railway and new parts are made or ordered largely from samples or manufacturers' description. This limits the source of supplies, as many manufacturers cannot compete for the business because of incomplete information on the requirements.

It is time that the place of the engineer of equipment in the operating organization of the electric railway be recognized. In no branch of the industry is there an opportunity for greater direct economies from the application of engineering methods of study and analysis than in the rolling stock and shops department.

The engineering division, in addition to carrying out the work of standardization which was discussed in the convention issue, should also include under one head all experimental work, all preparation of drawings and the studies of manufacturing and maintenance practices. To do this effectively the engineer of equipment should not be submerged in the maintenance organization but should be a member of the staff of the department head.

Most important of all, perhaps, in summing up the reasons why railways should maintain an equipment engineering division is the stimulus that this would supply in the general development of the electric rail vehicle. With all these engineers relieved of the burdens of routine maintenance and constantly thinking individually and collectively along lines of how to obtain better designs and more suitable materials, the cumulative effect in the industry would produce a much more rapid rate of development than has prevailed during the past ten years or so, during which the bulk of development work has been that done by the manufacturers due largely to competition.

What Is a Good Superintendent of Equipment Worth?

ON JULY 1 of a recent year a certain large railway company owned 633 cars, out of which only 360 were in service. This means that 273 cars were either in bad order or stored as obsolete. The number of pull-ins per day was averaging ninety, or 25 per cent of the cars in service, and the cost of conducting the mechanical department was $1,300,000 a year.

With this as the situation, a new superintendent of equipment took charge. During his first year the expense of operating the mechanical department dropped to $970,000, though ninety-five new cars were purchased whose maintenance was added to the work of the department. At the end of two years, with 728 cars total owned, the company had actually scheduled 690 cars. Only thirty-five cars were being held out for everything—wrecks, bad order, painting and general overhaul. The number of pull-ins per day was running from twenty-five to thirty, which is about 4 per cent of the cars in service, and the annual expense of the mechanical department had been cut to $820,000. For completeness, this record of accomplishment should include a notation that of the motors which had to be maintained about half were from twelve to twenty years old.

How was it done? One of the first steps taken by this new superintendent of equipment was to install a system which enabled him to know his costs. He organized the shops for maintenance work and got some new machine tools and employed some first-class mechanics. The investment in the new shop tools was quickly gotten back out of the savings resulting in labor and the more rapid production. The old motors were put in shape and a systematic overhaul program inaugurated. The whole difficulty in the past had been deferred maintenance and a careless planning of work.

What is a superintendent of equipment of these abilities worth? He made a saving of nearly half a million dollars in two years time in the annual cost of operating the mechanical department. But even more important than that, he increased the number of cars available for service, and therefore improved the company's ability to earn revenue, from 360 cars to 690 cars.

But what was this man paid? His annual salary was about 1 per cent of the saving he had been able to make, and it was only 0.6 per cent of the reduced annual expenditure of the mechanical department. He left the company after two years to accept a more lucrative position offered him in the manufacturing field.

When a man of this ability has demonstrated his worth, one would think that a railway company would not permit any one to deprive it of his services. The need for skill in railway maintenance work and the opportunity existing for making large savings are very great. Ability applied here should be paid for just as well as anywhere else.

Wood Preservation Means Forest Conservation

FOREST conservation is an extremely important national problem in this country, as this paper has pointed out at various times. Likewise it is one of growing seriousness as the timber is cut and not replaced. The situation is well expressed in the words of the late Joyce Kilmer:

> "Poems are made by fools like me,
> But only God can make a tree."

Even this does not tell the whole story because it does not tell how long it takes God to do the work. The rapidly disappearing forest is not a myth. It is a fact only too well understood by our Forest Service but unfortunately not yet appreciated by a great number of the larger consumers of timber.

There is, however, a method of conserving timber which is open and available to every one; that is, the preservation of it by certain well-known methods of treatment. The wood preservation committee of the American Electric Railway Engineering Association, which functioned for the first time this year, gave a great deal of information in its report as to how treatment of wood for railway purposes may be accomplished. The methods of treatment which are discussed in the report are such as are available to practically every user of timber. Their application will increase the life of the timber a great deal, the better methods making the life more or less indefinite. In fact, mechanical wear is the cause of most failure of timber thus treated. The results to be obtained from the various methods of preservation are fairly well known and guesswork has been practically eliminated.

Despite the work that has been done in the preservation of wood, the use of preservatives is not spreading as rapidly as would be desirable for the good of our forests. Figures presented elsewhere in this issue show that the amount of wood being treated at the present time is but little in excess of the amount being treated ten years ago. While this is due to some extent to policies of retrenchment that have been in force, still a great deal of untreated wood is used where proper preservative methods should be applied. The work of the wood preservation committee should bear practical fruit if its efforts result in a greater attention to treatment of timber.

It takes many years to reap the benefit of reforestation, but the benefits of wood preservation are available at once, and its immediate adoption would greatly lighten the burden on our already overtaxed forests. Wood preservation is an economic necessity which must sooner or later be recognized by every industry using wood for structural purposes.

Wheel, Gear and Axle Practice—II

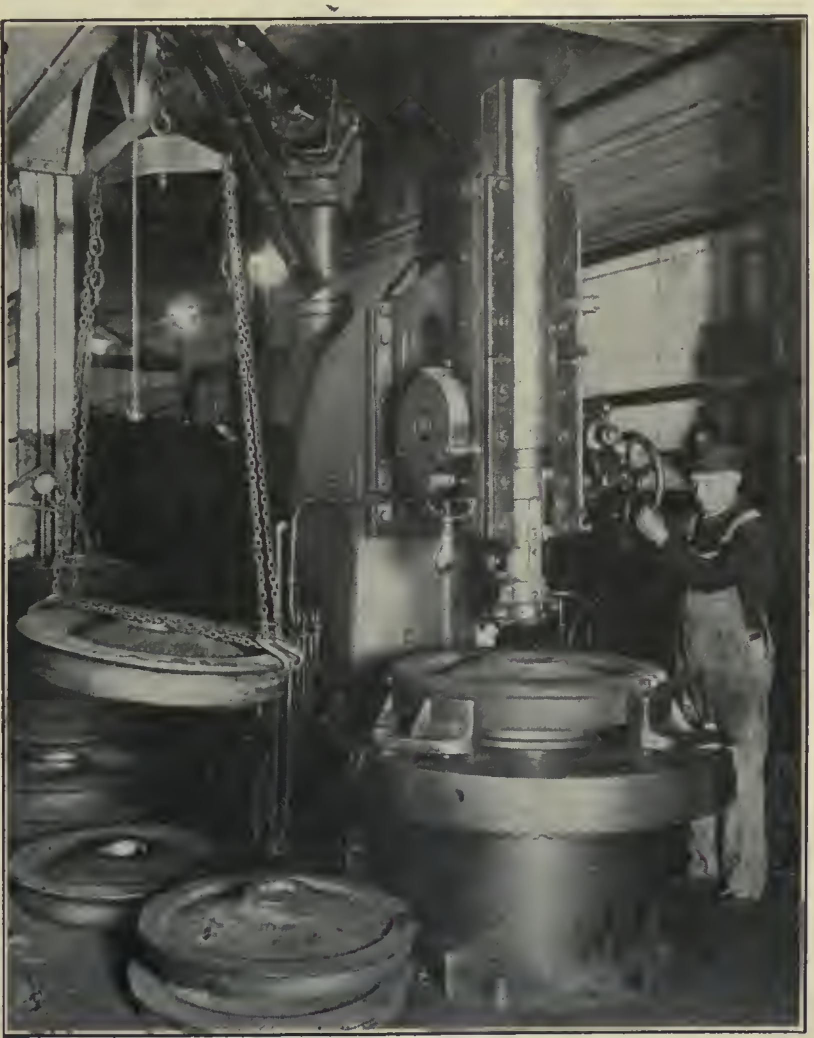
Efficient Arrangement of Machine Tools with Ample Provision for Placing Material Into and Taking It Out of Machines Reduces Cost and Time Necessary for Wheel and Axle Work—Storing Both Rough Material and Finished Products Adjacent to Machines Where Work Is Done Has Advantages—Savings Possible with Modern Machine Tools

The first article on this subject was published in the ELECTRIC RAILWAY JOURNAL *for Aug. 18, 1923. It contained information of the mileage obtained and costs resulting from the operation of cast iron and steel wheels, together with a discussion of some conditions that limit the life obtained from wheels and the expedients used to increase mileage of wheels in service. In this, the second article of the survey, methods, equipment and shop arrangement used in maintaining wheels and axles are treated.*

IN CONSIDERING the various shop layouts of the sixty railways visited in making this survey it was found that in most cases the machines for wheel and axle work were grouped in one section of the shop. This proves particularly effective in reducing the number of times that wheels and axles must be handled and it also reduces the amount of handling equipment needed. Where railways have several shops at which inspection and overhauling are done, wheel and axle work is quite generally centralized at one shop. On most of the larger railways the system is organized into divisions, and wheel and axle work for the different divisions is done at the shop most centrally located. Wheels and axles requiring maintenance work for the different divisions are sent into and returned from the wheel and axle department on supply cars. These supply cars are usually provided with a derrick for quick handling. The larger systems have a definite schedule for the operation of such supply cars and by this arrangement a single car and crew can take care of the entire distribution. On one system the supply car was said to average only 180 miles per six-day week. This shows how great a saving in mileage can be made by bringing car equipment to the places where the cars are housed rather than by running the individual cars to a distant shop for every change in wheels or axles.

The equipment in the wheel and axle departments will vary, of course, with the number of cars and the variety of wheels used. Where steel wheels are used the wheel and axle department will ordinarily have a wheel press, boring mill, wheel lathe and axle lathe. In addition some shops have an axle straightener, welding machine for building up flanges and axles, and a few have a milling machine for cutting key ways. Railways using cast iron wheels in most cases have a wheel-grinding machine of some form, either pit type or floor type.

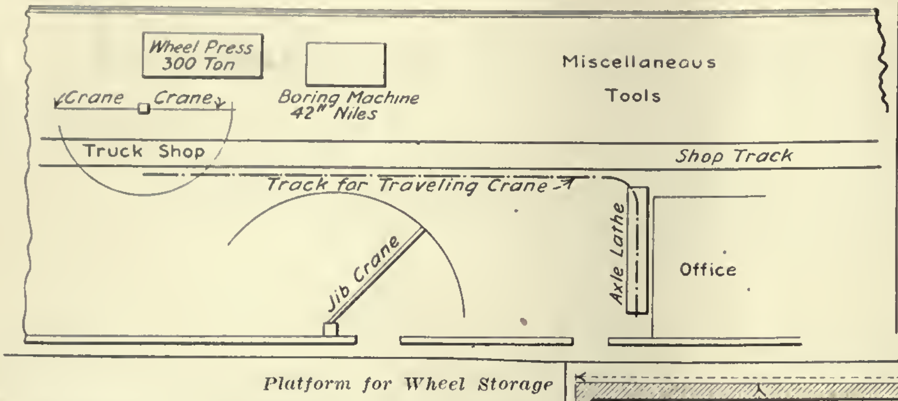
The wheel presses used for electric railway service run from 250 to 400 tons capacity, with a large majority using the 300-ton size. Wheel lathes and boring mills are used in sizes from 34 in. to 48 in., with a majority of roads favoring the use of the 42-in. size. Axle lathes are used in sizes from 20 in. to 36 in. Jib cranes are quite universally used for serving the individual machines, with some provisions for moving the wheels and axles about the department, or to and from storage by either overhead traveling cranes, traveling trolley hoists or wheel and axle wagons.



Boring Mill in Boston Elevated Railway Shop, Equipped with 15-Hp. Motor and with 1,000-Lb. Air Hoist

The tool spindle of this boring mill has provision for three tools, one for making the rough cuts, one for the finishing cuts and one for the fillet cuts. The various cuts can be made without changing the position of the wheel on the bed.

A convenient and well arranged wheel storage is a great time and labor saver. A very satisfactory arrangement is used at the Chattanooga shops of the Tennessee Electric Power Company. A concrete platform has been constructed at the sides of the shop on the same level as the shop floor. One of the yard tracks runs alongside the platform so that wheels can be loaded readily on and

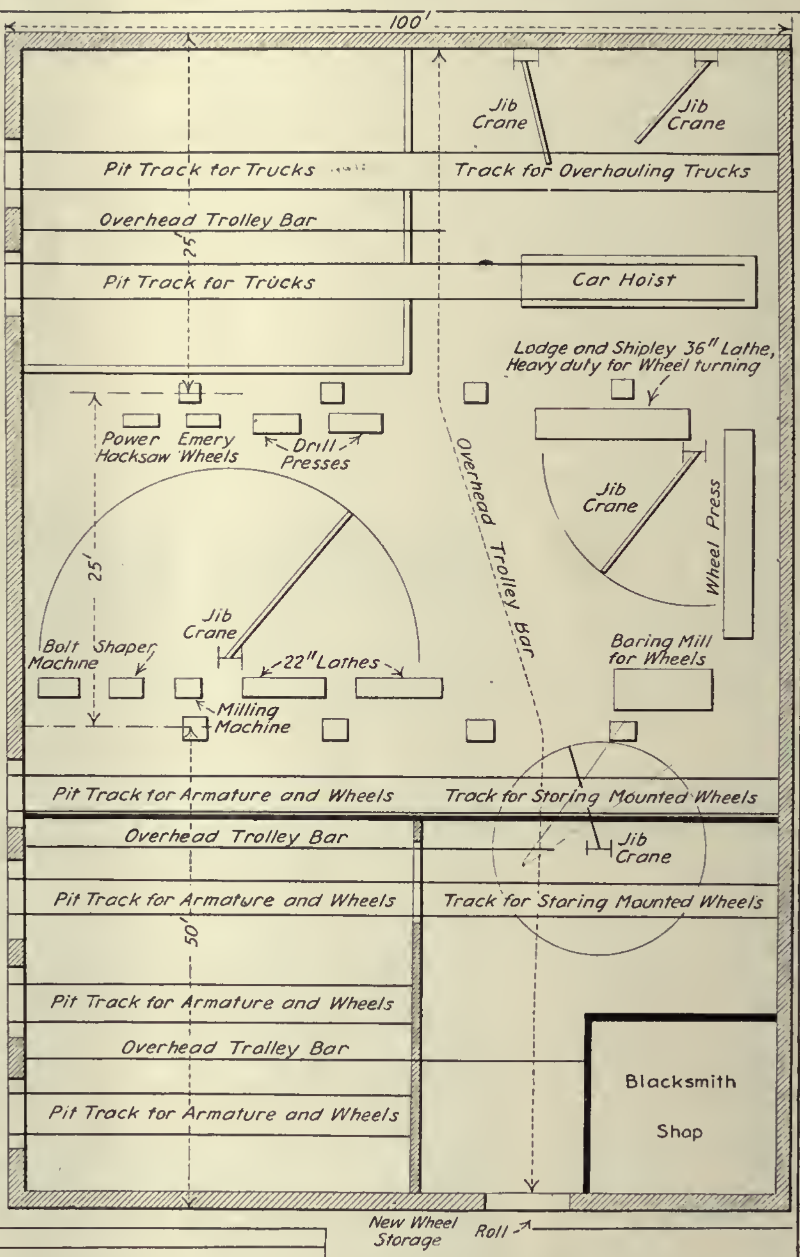


Wheel and Axle Work at Terre Haute, Norfolk and Chattanooga

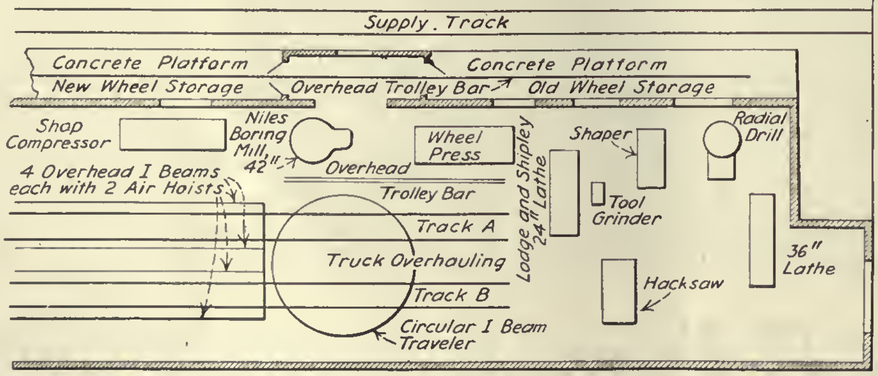
In the shops of the Terre Haute Traction & Light Company, shown in the top plan, a wheel press, boring mill and axle lathe are all located adjacent to the truck overhauling track. Three jib cranes and an overhead traveling hoist are used for handling the wheels and axles. Wheels that require removal are taken to the wheel press and axles that require turning to the axle lathe by the overhead traveling hoist. New wheels are stored on a platform just outside the shops. After rolling in through an adjacent doorway, they are handled by a jib crane and the overhead traveler to the boring mill for boring. After finishing, they are sent to the wheel press for mounting. From here the wheels are rolled and handled by the crane to storage, which is on shop tracks outside the shop. Wheels are turned by the use of an oxyacetylene torch as described in the ELECTRIC RAILWAY JOURNAL for July 21, page 104, and as a result a wheel lathe is considered unnecessary.

Handling Wheels and Axles at Norfolk—The wheel and axle department of the Virginia Railway & Power Company, Norfolk, Va., shown at the right, is located at the end of the shop between tracks used for truck overhauling and for general inspection work.

Wheels that have reached their limit of wear are handled direct from the truck overhauling track to the wheel press by means of an overhead trolley hoist. A jib crane is also conveniently located to serve both the wheel press and wheel lathe. New wheels are stored on a concrete platform outside of the shop. They are rolled from this storage to a doorway and from that point are handled to the boring mill by the same overhead traveling hoist which runs entirely across the shop. After finishing and mounting, the wheels are stored on two tracks adjacent to the boring mill. Axle work is done on two lathes adjacent to the wheel boring mill. This arrangement of jib cranes and overhead traveling hoists is particularly effective for handling various equipment parts.

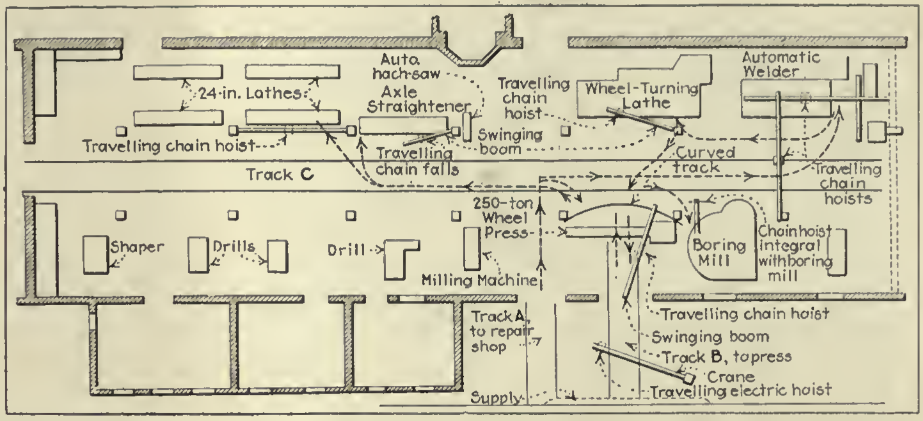


Arrangement of Wheel Work in Shop of the Tennessee Electric Power Company—The wheel and axle department of the company in Chattanooga, shown in the lower plan, is adjacent to the shop overhauling tracks. Supplies are delivered to a concrete platform along the side of the building and are handled from this storage to machines. A circular I-beam traveler reaches across the two truck overhauling tracks, as described in the ELECTRIC RAILWAY JOURNAL for July 21, 1923. The front end of the overhauling track is equipped with four overhead I-beams, each with two air hoists for convenience in lifting car bodies. Wheels that have reached their limit of wear are taken from the truck and handled by an overhead trolley to the wheel press. From the boring mill, wheels are handled to the wheel press by the overhead trolley bar.



Eastern Massachusetts, Third Avenue and Puget Sound Companies' Practice

The Chelsea Shops, shown at the right, handle all wheel and axle work for the Eastern Massachusetts Street Railway System. A supply car picks up the wheels and axles requiring repairs and brings them in. The wheels are unloaded by a crane and placed on tracks A and B. Wheels with worn flanges are placed on track A and are then rolled into the main-aisle track C. A telpher removes the wheels from this track and places them in position in the automatic welder, where worn flanges are built up. After this operation the wheels are again removed by the same telpher system and by a swinging post derrick which serves the wheel lathe. After turning wheels are placed on the outgoing track B for delivery to the supply car.

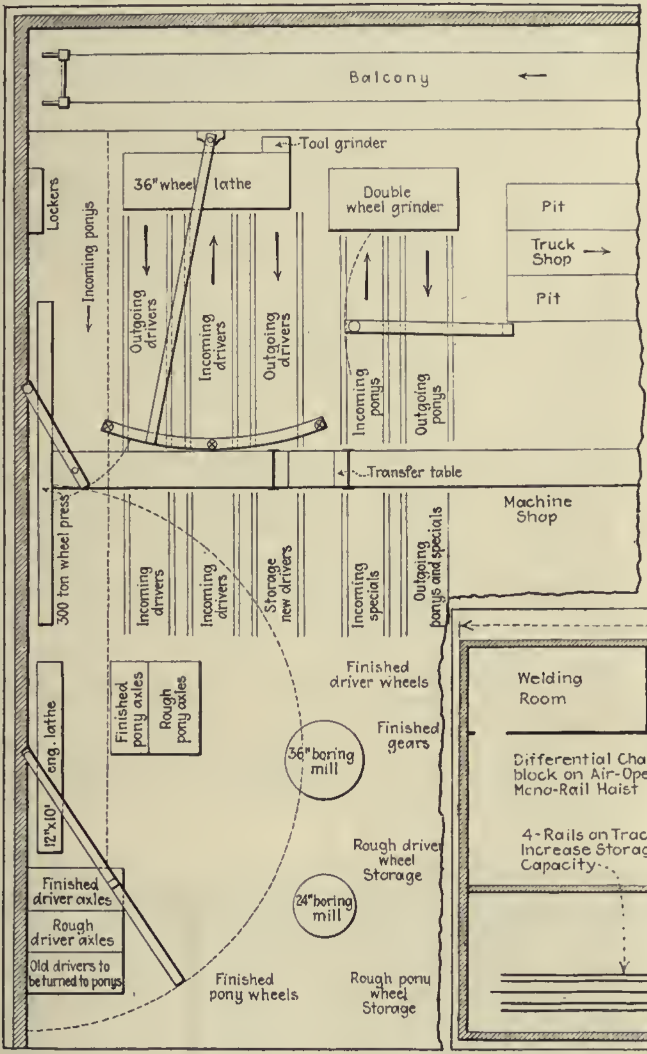


Wheels which have reached their limit of wear are delivered by the car to track B, from which they are rolled to the wheel press, where they are removed. New wheels are taken from storage directly under the electric derrick and are installed. The electric derrick also serves the boring mill, to which new wheels are taken in quantities of twenty. Here they are bored to their respective dimensions and then laid aside for mounting. Axle work is done by the machines at the left in the upper illustration.

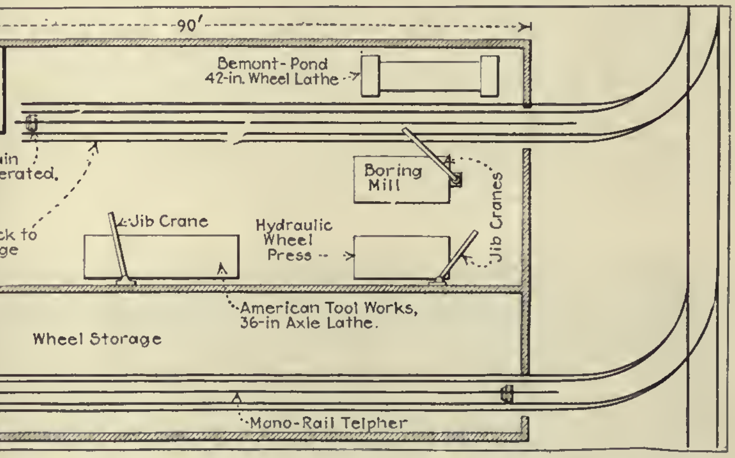
Speedy Routing a Feature of Third Avenue Shops—The wheel and axle department of the Third Avenue Railways, New York, shown in the plan at the left, presents an orderly and compact arrangement. Wheels and axles are received either from cars which run into the shop on the balcony, or from the truck overhauling shop, adjacent to the wheel and axle department. Both of these, together with other departments, are served by a large overhead traveling crane, which delivers the incoming material to the particular track or location designated for receiving it. After inspection the units are routed in three ways: First to the wheel press for dismounting, if any part is to be scrapped, or should an axle need to be turned or straightened; second to the grinder, for cast-iron wheels, and, third, to the lathe for turning steel wheels.

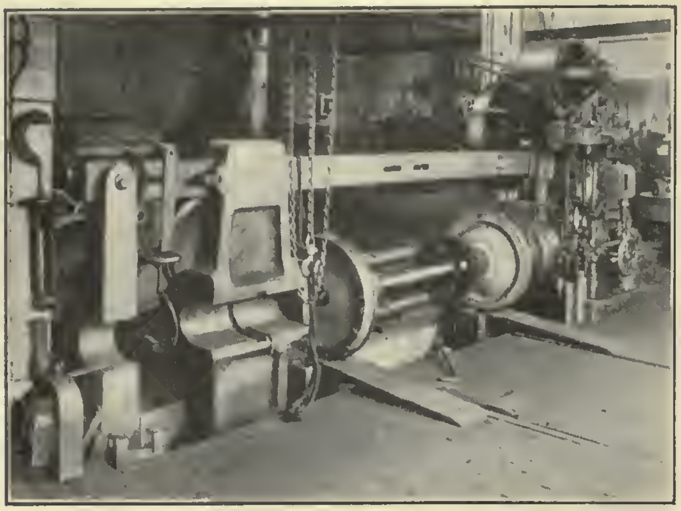
Wheels and axles are finished in the boring mills and axle lathes and then stored in their particular section. They are handled from these storage points to the wheel press by means of a large jib crane. After the units have been assembled they are routed either direct to the wheel lathe or grinder, if work by these tools is required, or to the outgoing tracks for inspection.

The wheel press is served from the floor by the transfer table and by a 1-ton air hoist mounted on a 10-ft. jib crane. The wheel lathe is served by a 1-ton electric hoist, mounted on a 22-ft. radial roller crane. The wheel grinder is served by a 1-ton air hoist mounted on a 10-ft. jib crane, and a 20-ft. jib crane equipped with a 1-ton chain hoist takes care of the axle lathe and the boring mills.



Equipment for Wheel Repair in Shop at Tacoma, Wash.—Wheel and axle work for the Puget Sound Electric Railway, the Tacoma Railway & Power Company and the Pacific Traction Company is taken care of at the Tacoma shops, shown above. A large wheel storage space is provided adjacent to the general machine shop. This has four rails on the track in order to increase the storage capacity and is served by an overhead traveling telpher. Wheels and axles that require machining are delivered on the track in the general machine shop. Where wheels are to be scrapped or axles turned or straightened, these are delivered to the hydraulic press. Wheels that require re-turning are routed to the wheel lathe. New wheels are bored out in the boring mill and axles are turned in a 36-in. lathe. All these machines are served by jib cranes, and in addition a differential chain block on an air-operated monorail overhead hoist runs the length of the shop over the track. The welding room forms one corner of the shop and flanges are built up where warranted.


90'
Welding Room
Bemont-Pond 42-in. Wheel Lathe
Differential Chain block on Air-Operated Mono-Rail Hoist
Boring Mill
Jib Cranes
4-Rails on Track to Increase Storage Capacity
Jib Crane
Hydraulic Wheel Press
American Tool Works, 36-in Axle Lathe.
Wheel Storage
Mono-Rail Telpher



Motor-Driven 250-Ton Hydraulic Wheel Press in Chelsea Shops of the Eastern Massachusetts Street Railway

This press is equipped with triple pumps and has hydraulograph attachment.

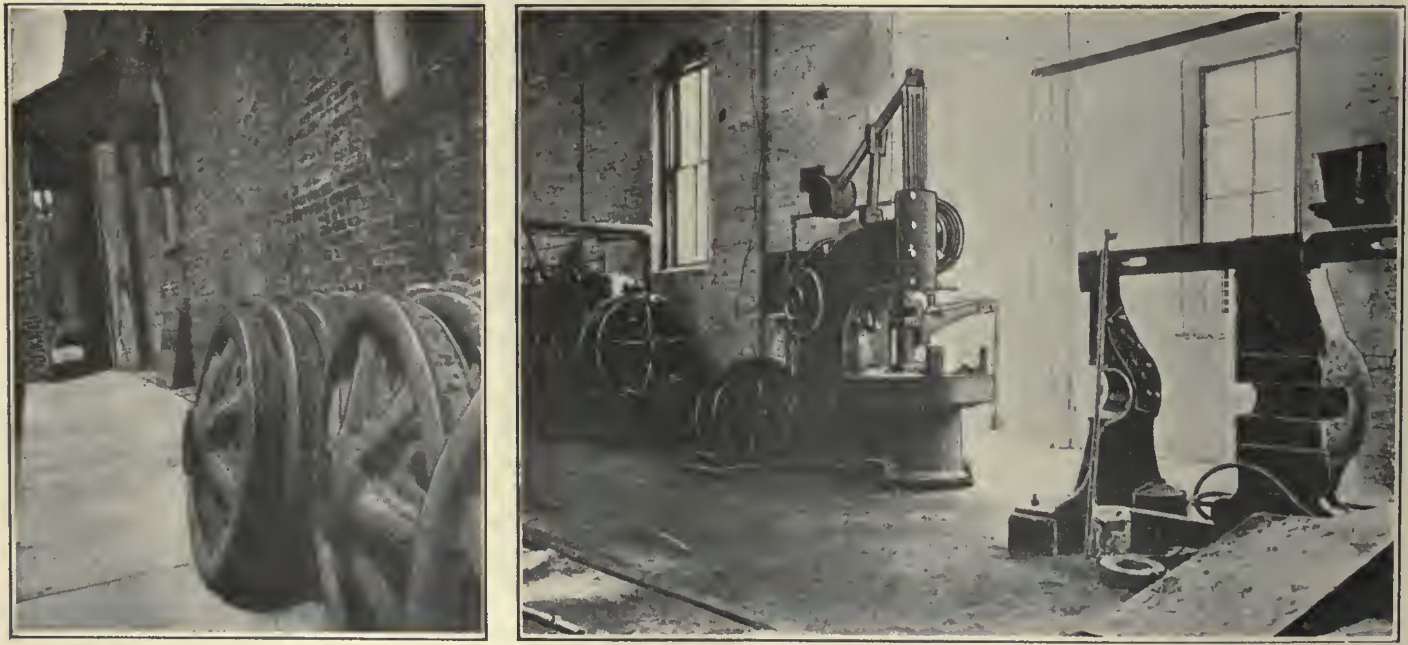
off the storage platform from a car run alongside. The center part of the platform is taken up by a bay projecting out from the shop. Folding metal-covered doors are provided at each side of the projection. An overhead hoist travels the entire length of the platform and the overhead track on which it runs extends through the shop projection. With this layout wheels can be picked up by the hoist and handled into the shop and placed right at the machines. Scrap wheels are taken out and placed in position for loading in the same manner. This system involves but one handling in either case. New and scrap wheels are kept separate by using one end of the platform for new material and the opposite end for scrap. Accompanying illustrations show the platform and the interior arrangement of the shop, with wheel press and 42-in. boring mill located right at the projecting bay. Several other railways have found a great advantage in having storage space for rough material in the immediate vicinity of the tools on which the work is done, rather than in a general storeroom.

The storage of wheels, after they are mounted on axles, usually is taken care of in a space with tracks and the wheels are placed on the tracks. In order to economize on space several railways have provided this storage with gauntlet tracks, one rail being placed between the rails of the adjacent track. Wheels when stored are then staggered so as to fit inside those on either side. This arrangement is of particular advantage where mounted wheels are stored inside the shop adjacent to the wheel and axle department. It has been successful in the Sixty-fifth Street shops of the Third Avenue Railway, New York City, and in the Tacoma shops of the Puget Sound Electric Railway.

A number of layouts of the wheel and axle departments for different railways are shown in accompanying illustrations, and where a particular routing is followed for the work this is given. In most smaller railway shops, however, very little attention is given to routing the work to the different machines. Of course it is not such an important factor here because wheels and axles are taken out of trucks for some special attention and they go directly to the machine where the work is to be performed and when finished are often either returned to the same trucks or taken to storage. On the larger railway properties more attention has been given to the location of the various machines so that the work can be handled from one operation to the next without interference and with the least labor.

SHOP REARRANGEMENT INCREASED OUTPUT 50 PER CENT

An accompanying illustration shows the recently rearranged wheel and axle department of the Third Avenue Railway, New York City. Particular attention was given to routing the wheels and axles and an orderly and compact arrangement resulted. Incoming and outgoing material are kept entirely separate. As a result of the rearrangement, production of pairs of wheels necessary for delivery to the truck overhauling shop and to the various carhouses was increased 50 per cent and at the same time the cost per pair of wheels handled was reduced 20 per cent. By providing ample labor saving devices for handling, not only were costs reduced and production increased, but inspection of the



Left—Wheel Storage Platform at the Chattanooga Shops of the Tennessee Electric Power Company. Right—Extension of Shop Over Platform Facilitates Bringing Wheels Into the Shops for Machining

finished material is made in a more thorough and orderly manner. This is of particular advantage in this shop, due to the piece work system employed.

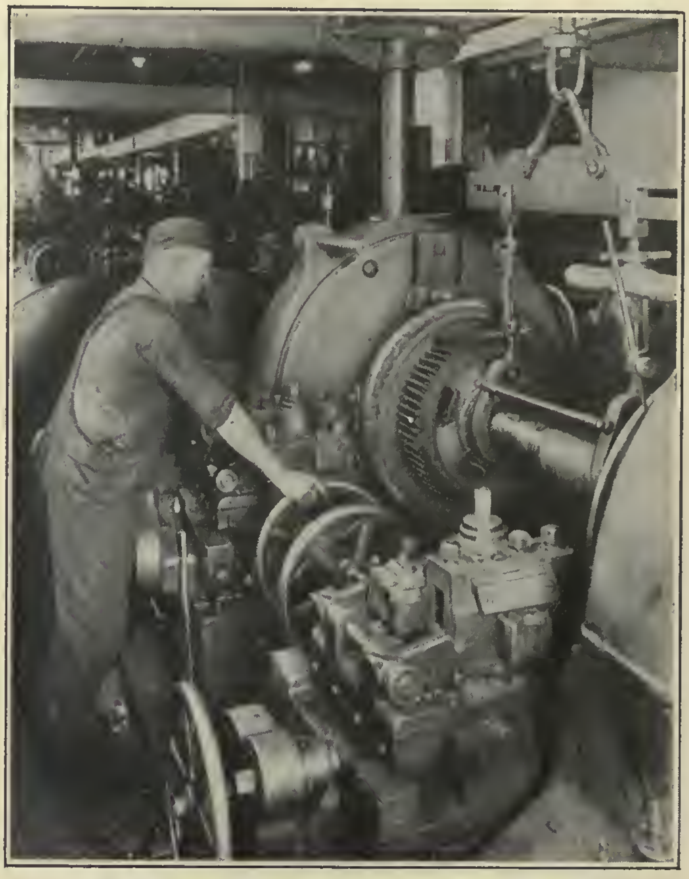
OLD TOOLS CAN BE PARTLY MODERNIZED

Along with the rearrangement of machine tools, two railways report changes in the machines themselves in order to provide for increased duty. In Brooklyn two wheel lathes had their 15-hp. motors replaced by motors of 40-hp. capacity. New spool castings with heavier face plates, new drivers and pneumatic tool clamps were also installed. The rugged construction of the lathes made it possible to take advantage of high-speed operation so that the output of each machine was increased 100 per cent.

A 36-in. wheel lathe in the Sixty-fifth Street shops of the Third Avenue Railway was provided with two new tool posts. Additional parts for the old ones were also purchased so that these are held in reserve. A double wheel grinding machine was overhauled and the driving rigging was improved. A new exhaust system was also installed.

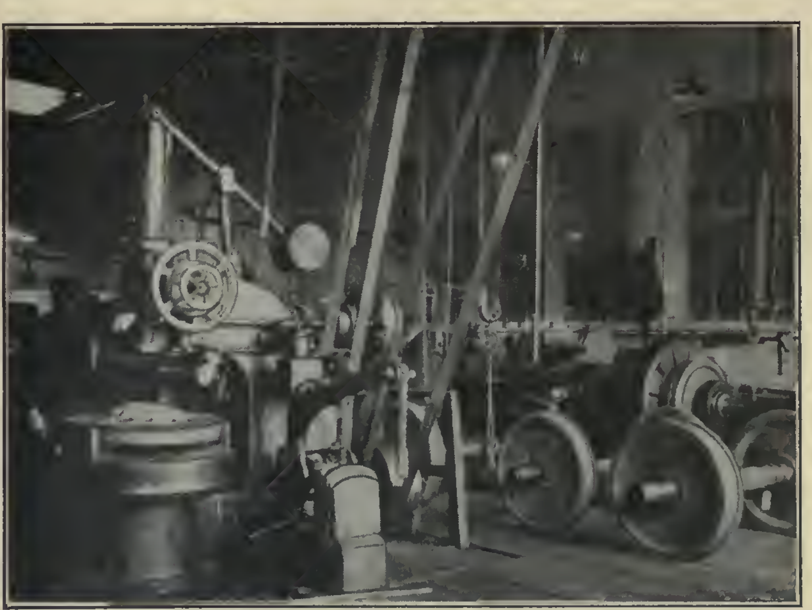
Several railways have increased the efficiency of wheel and axle departments by installing new machines and replacing hand-operated chain hoists by a motor or pneumatically operated type. Several of the new type boring mills used by electric railways are equipped with air hoists integral with the machine and with provision for several tools on the tool spindle. The various cuts necessary in finishing a wheel can thus be made without changing the position of the wheel on the bed. This convenience together with better facilities for handling has enabled a 34-in. wheel to be bored in fifteen minutes, whereas with older equipment seven pairs in an eight-hour day was the limit.

A late type of wheel press is used in the Thirty-sixth Street inspection and overhauling shop of the Brooklyn-Manhattan Transit Corporation and in the Morris Park shops of the Long Island Railroad. These have provision for four tools in each of the two turret toolposts. The tools used are a roughing tool for the wheel tread, a flange roughing tool, a combined tread and flange finishing tool and a chamfering tool. This is a 42-in. lathe on which a ⅜-in. cut can be made at high speed. An average of two pairs of wheels per hour is being turned out in the Thirty-sixth Street shops. Through the use of the efficient clamping arrangement provided, wheels can be removed and new ones put in place for turning in two minutes. One man and a helper are used in operating this wheel lathe, and they are turning out as much work as was previously done by nine men and several older type machines.

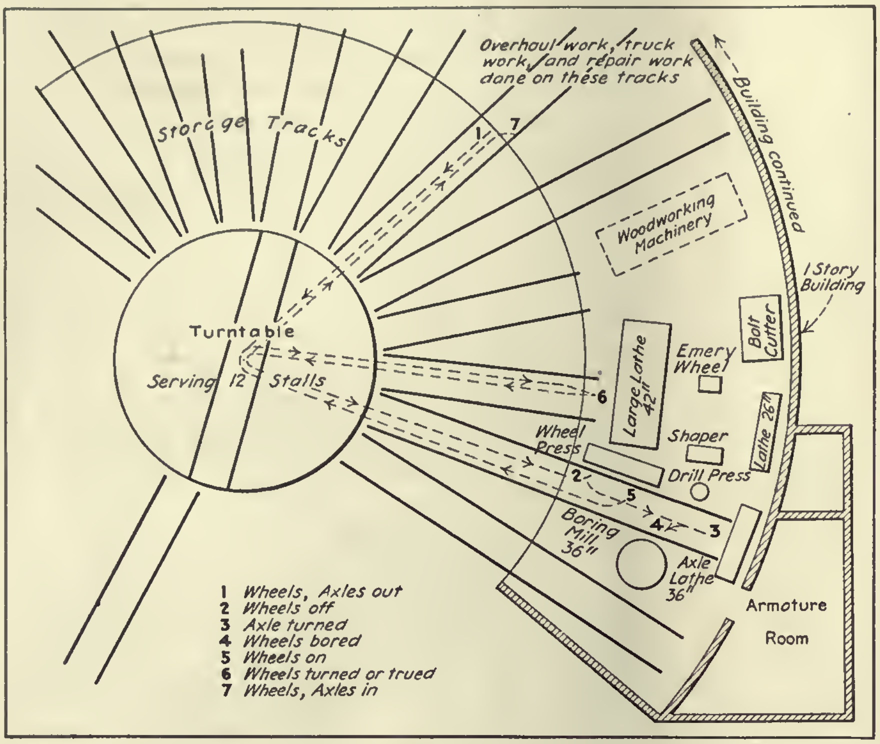


Wheel Lathe in Boston Elevated Railway Shop

This lathe has repeatedly turned a pair of steel wheels in fifteen minutes. It is driven by a 50-hp. motor and has two tool posts, both wheels of a pair being turned simultaneously. The tailstock is driven by a 6-hp. motor and an air hoist above the lathe handles the work. The lathe has a 42-in. swing.



Left—Huntington, W. Va., Shop of the Consolidated Power & Light Company, with Overhead Traveling Crane to Serve the Wheel and Axle Department. Right—Boring a Wheel in the Tacoma Shops of the Puget Sound Electric Railway. A Portion of the Wheel Lathe Is Seen in the Background at the Right



Work at Shops of Waterloo, Cedar Falls & Northern Railway

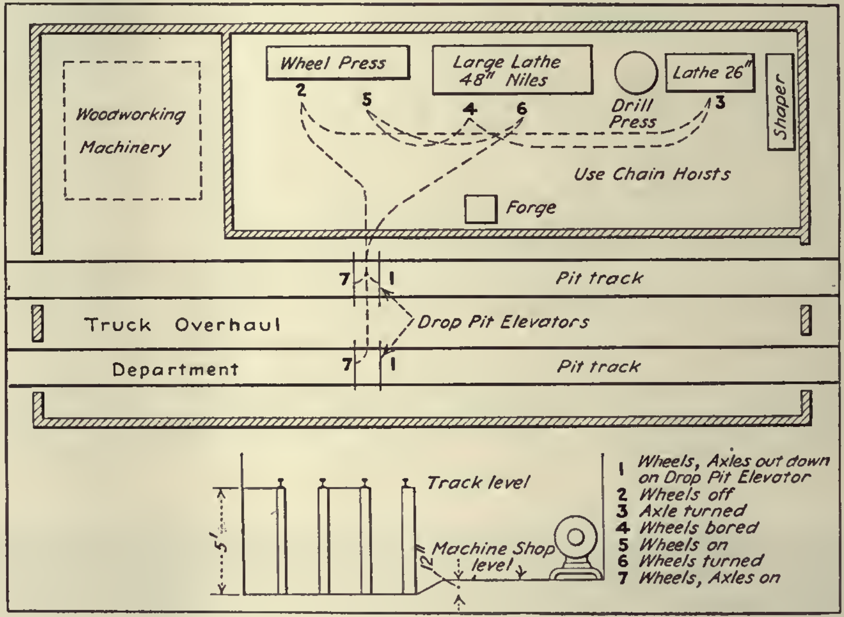
A round house serves as a shop for the Waterloo, Cedar Falls & Northern Railway. Wheels and axles are removed from trucks on the tracks used for truck overhauling work. An electric crane mounted on a small car transports the wheels and axles from the dismounting track to the turntable and then to the machine on which the repair work is to be done. The shop is equipped with two axle lathes.

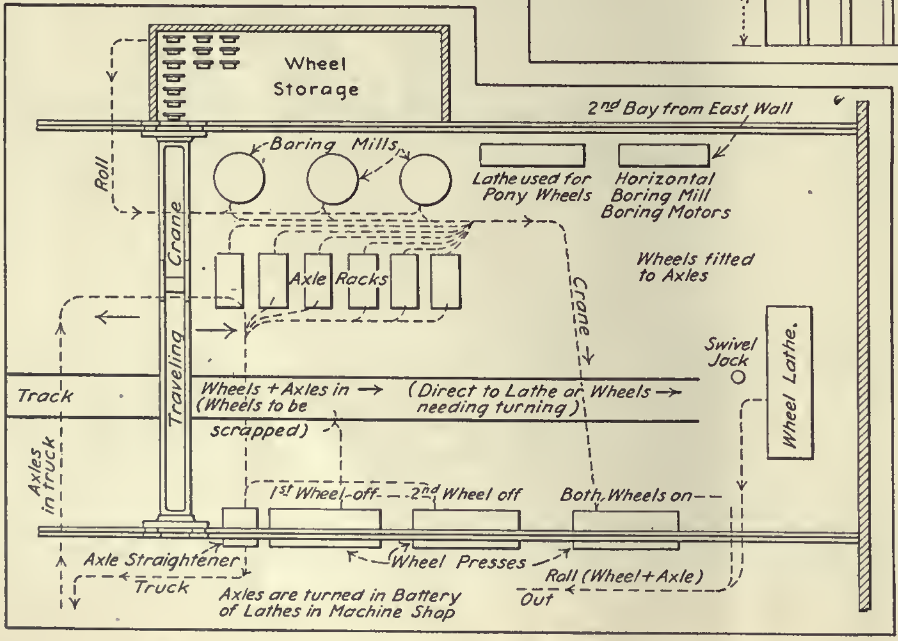
The track serving the 36-in. axle lathe also serves the 36-in. boring mill and wheel press, so that the wheels requiring removal are brought in on this track to the wheel press, and if the flanges and treads require turning they are handled on the adjacent track direct from the crane car to the wheel lathe.

New wheels can be brought in on a track adjacent to the boring mill and after being bored can be stored alongside. When they are required for mounting, they are handled from this position to the wheel press.

Shop of the Iowa Railway & Light Company, Cedar Rapids, Iowa

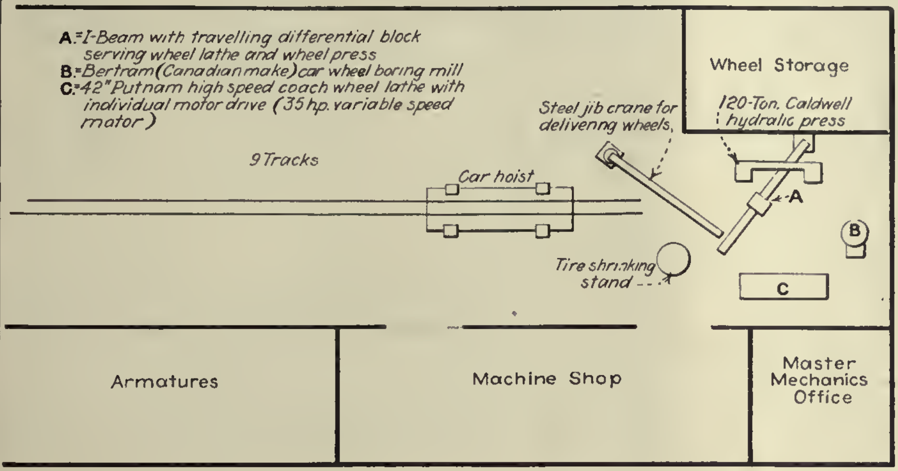
The floor level of the wheel and axle department in this shop is approximately 4 ft. below that of the pit track. Drop pit elevators are used for removing the wheels and axles from cars, and they are thus delivered to the wheel and axle department. Where wheels require renewing they first go to the wheel press and the axle then is delivered, if re-turning is necessary, to a 26-in. lathe by means of a chain hoist. After turning, it is again delivered to the wheel press. Wheels are turned in a 48-in. lathe, and after drilling to proper size are also delivered to the wheel press for mounting. The location of the wheel and axle department adjacent to the truck overhauling department is found particularly convenient.





West Shops of Chicago Surface Lines

A track leads direct to the wheel lathe for turning wheels with sharp flanges. Where wheels are worn to the limit, they are handled from this track to the wheel presses. Three wheel presses mounted in a row are used as indicated for wheel removal and mounting, and an axle straightener is conveniently located at one end. On new work, wheels are taken from the wheel storage and rolled to three boring mills. Wheels are thus bored out to fit the various axles on which they are to be pressed and are then handled by cranes to the wheel press used for installing wheels. Axles are turned in a battery of lathes in the machine shop, adjacent to the wheel and axle department.

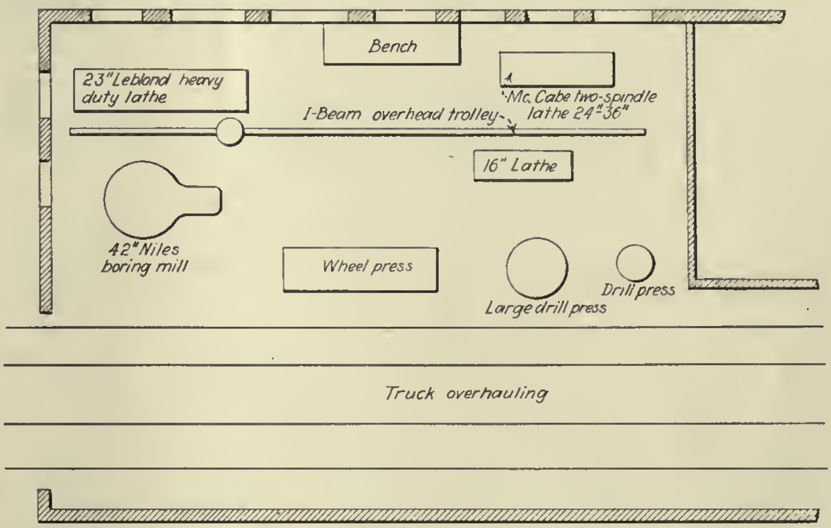

A=I-Beam with travelling differential block serving wheel lathe and wheel press
B=Bertram (Canadian make) car wheel boring mill
C=42" Putnam high speed coach wheel lathe with individual motor drive (35 hp. variable speed motor)
9 Tracks
Car hoist
Steel jib crane for delivering wheels
Wheel Storage
120-Ton. Caldwell hydralic press
A
B
Tire shrinking stand
C
Armatures
Machine Shop
Master Mechanics Office

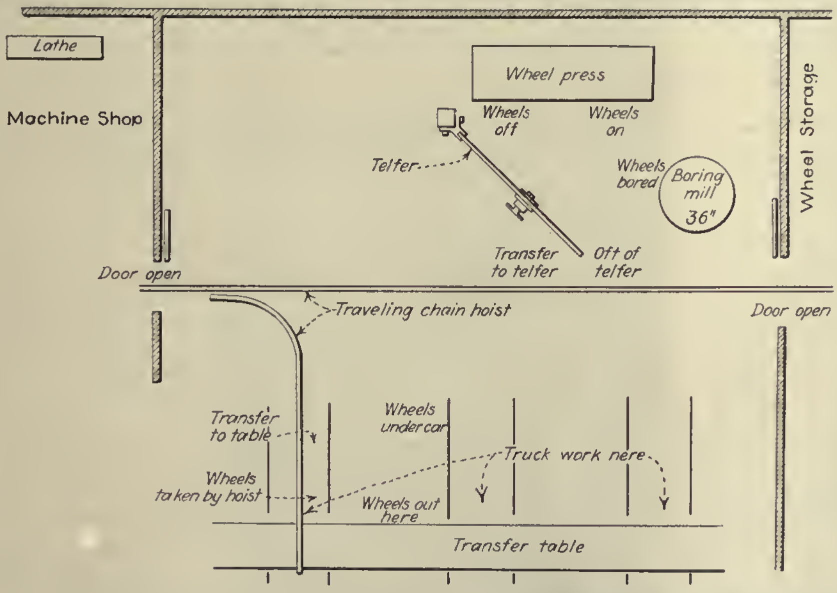
Wheel and Axle Equipment of the British Columbia Electric Railway

Wheel work in Vancouver, B. C., is done in a section just to the rear of the overhauling shop. A high-speed wheel lathe, 120-ton hydraulic press, wheel boring mill and tire-shrinking stand form the equipment. These are served by two jib cranes. Wheel storage is provided just back of the wheel press, and axle work is done in the machine shop, adjacent to the wheel department. Tires are also bored on a boring mill in the machine shop. The tire-shrinking stand has a concrete base with central hole and steel blocks to hold the wheels.

Wheel and Axle Department Adjacent to Truck Overhauling Track in Knoxville

Wheels requiring removal can be handled directly from the overhauling tracks to the wheel press in the shop of the Knoxville Power & Light Company. A 23-in. heavy duty lathe located in the corner is used for turning steel wheels, but as both cast iron and steel wheels are used on the system, this machine is required infrequently for this work, but it is also used for turning axles. A 42-in. boring mill with a five-jaw universal chuck is used for boring out wheels and gears. Two other lathes, one 16 in., the other double-spindle motor driven, are used. An I-beam overhead traveler serves this department. The shop floor is made of wood blocks.



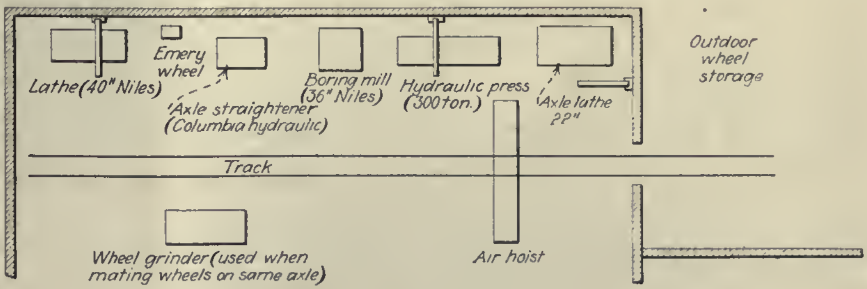


Wheel and Axle Practice of the Tri-City Railway, Rock Island, Ill.

No provision is made for grinding or turning wheels in the wheel and axle department of the Tri-City Railway at its Rock Island shop, as interurban steel wheels are sent out for turning and wheel-truing brake shoes are used for grinding cast wheels. The wheel and axle department is at the rear of the truck overhauling tracks. After removal, wheels are placed on the transfer table and from this are picked up by a traveling chain hoist. This overhead traveler serves the wheel and axle department and the machine shop. Axle work is done in a lathe in the machine shop. Wheel storage is provided at the side of the shop adjacent to the wheel and axle department, and a door opening is provided so that wheels can be handled from storage by the overhead traveler.

Portland Railway, Light & Power Company

The wheel department of this company in Portland, Ore., has a concrete floor and is traversed by one track. Wheels come in from the various divisions on flat cars and are unloaded by an overhead air hoist. They are rolled about the floor by hand, and the various machines have jib cranes. Outdoor wheel storage is provided at the entrance.


Lathe (40" Niles)
Emery wheel
Axle straightener (Columbia hydraulic)
Boring mill (36" Niles)
Hydraulic press (300 ton.)
Axle lathe 22"
Outdoor wheel storage
Track
Wheel grinder (used when mating wheels on same axle)
Air hoist

Left—Handling an Axle After One Wheel Had Been Removed in the Shops of the Terre Haute Traction & Light Company. Right—A 42-In. Boring Mill with Hoist Attachment Is Used for Wheels in the Shop of the Indianapolis Street Railway

The wheels are brought into and taken away from the wheel press on two tracks, one above the other—one on the floor level and the other elevated above this a distance of about 4 ft. Wheels requiring turning are brought in on the upper level and the finished wheels go out on the floor level. This arrangement is convenient for locations where space does not permit having two tracks on the same level.

GREAT VARIATION IN COSTS OF TURNING WHEELS

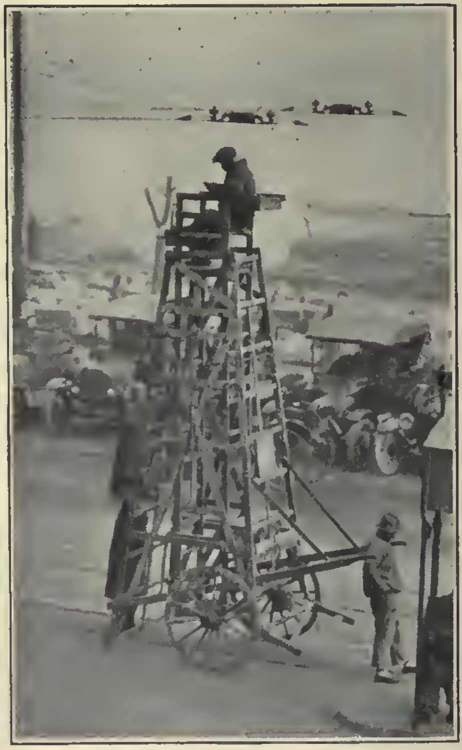
In analyzing costs for turning steel wheels a considerable variation was found. This is explained by the great difference allowed in the wear of wheels on different properties by the varying facilities for handling, and whether or not the machine tools used are modern or out of date. Some roads remove wheels for turning at quite frequent intervals and do not allow flanges to become very sharp, while others allow a large amount of flange wear. Some high-speed interurban railways feel they would be taking a chance of having accidents if flanges were allowed to become sharp. Some others find flanges wear more rapidly after they are partly worn and while continuing them in service watch them very carefully during the latter period of use. When the flange wear appears excessive the wheels are removed and turned.

The amount of metal which must be turned off the tread, of course, depends on the condition of the flange, varying from ⅛ in. to ⅝ in. Very few roads keep a record of the amount of metal turned off, so it is impossible to give a comparison of costs per inch depth of tread metal removed. Costs reported for turning a pair of steel wheels range from 35 cents to $2, with an average of about $1.25. Several large railways are obtaining excellent results from the piece-work plan of payment for wheel turning. The Interborough Rapid Transit Company, New York City, has used the piece work system since 1912, and some interesting figures of the results obtained in turning steel wheels were published in the ELECTRIC RAILWAY JORURNAL for March 17, 1923. By using the latest improved machinery, high-speed tool steel and the piece-work plan the output in this company's shop has been increased to twenty-five pairs of wheels per day per man. It should be mentioned, however, in this connection that the Interborough company does not allow its wheel flanges to become excessively worn, so that the amount of tread metal removed per turning is less than that for most electric railways.

Tool grinding machines are also very important adjuncts to a wheel and axle department. In most railway shops grinders are located either in or close to the tool room. In comparing the amount of work turned out by similar machine tools, the importance of close attention to cutting tools was very apparent.

Tower Wagon in Shanghai, China

COOLIE labor is very cheap in Shanghai, China, and as a result it is used as the motive power for various maintenance of way and line vehicles. The accompanying illustration shows a trolley inspection and repair wagon in position for making repairs. Without pressure on the handle a support is in contact with the roadway and this, together with the wheels, gives a firm foundation. By pushing down on the handles the tower balances over the wheels and can be readily transported by the Chinese coolie. While coolie labor is used for truck vehicles, it is quite evident from the accompanying illustration that automobiles are quite generously used for passenger riding. The trolley lines are also reported as being very liberally patronized by the Chinese residents of Shanghai, who are very fond of riding on the street cars and other conveyances.



Making Overhead Repairs in China

Putting Overhaul on a Production Basis

Many Methods Developed by Manufacturers Can Be Applied to the Railway Repair Shop—Scheduling All Work Can Be Done and Non-Productive Time Cut Down—Labor-Saving Devices Are Advantageous

*By Henry S. Day**

Railway Department Westinghouse Electric & Manufacturing Company

ALL successful manufacturing plants turn out their product on very definite schedules built up for the necessary processes and operations required to turn the raw material into a finished product. The one aim sought is to keep the workers continuously performing their allotted tasks without interruption caused by shortage of raw materials, non-progressive movement of work in process and shutdowns of machines due to plant failures.

To accomplish this a manufacturing program is planned months ahead of time. The first thing done is to obtain the raw material. Careful studies are made of the various machine tools needed in the process, and the capacity is figured to get daily output of each machine. Each lot of parts, then, is routed and timed to progress without blocking other lots, or keeping machine tools idle waiting for work, or overloading them, thereby keeping operatives idle waiting for parts.

PLANNING TO CUT DOWN NON-PRODUCTIVE TIME

Two of the greatest difficulties are to cut down non-productive hours and time required to handle or move material, either raw or in process of manufacture. Unless this planning is incorporated, serious losses will result. For many years little thought was given either to this feature or to the arrangement of buildings, machinery or facilities; but at present a new manufacturing plant has incorporated in the initial plans all of the physical arrangements that will make possible concentration of departments, progressive movement of raw materials, and work in process. Even the make-up of the organization that will operate it is provided for.

While this has been true in the case of leading manufacturers, it has not been applied to the same extent by the electric railways in the big shops they must operate to maintain their rolling stock. These shops employ large forces of men and use great amounts of material. While the operations do not duplicate those in a manufacturing establishment, unquestionably many of the money-saving methods and facilities of the latter can be applied to the car repair shop.

A schedule in the electric repair shop reduces to concrete values the work to be done, and makes possible the planning that bridges over the time between purchase of the materials and when the car actually enters the shop for overhaul.

The first and greatest problem in succesfully overhauling cars is to carry in stock at all times the right kind and quality of materials and supplies to meet the production schedule of a definite number of cars overhauled per day, and to make it possible to order in a car on a predetermined date and turn it out exactly on another predetermined date. The effectiveness of any production schedule is lost if this is not done, and it cannot be done unless material is available.

Co-operation between the shop and the stores department must exist to the highest extent. Unless the purchasing agent and storekeeper are working months in advance of shop schedules they cannot be expected to supply the demands. Cars running long over the shopping time planned not only demoralize the shop schedule, but hold rolling stock out of revenue service. A definite schedule, closely followed, also supplies the only means whereby the master mechanic can aid constructively the storekeeper in properly ordering stores.

In speaking of a production schedule, it is not sufficient to figure how many cars will have to be overhauled each year from the number owned and the total miles operated. It is very simple, for instance, to figure that for a road operating 1,000 cars averaging 3,000 miles per month, an overhauling period of 50,000 miles will require each car to be shopped approximately every 16½ months; and that to do this, working 300 days per year, it would be necessary to put through the shop 2.4 cars per day. This is but the beginning. Besides the regular overhaul a certain number of wrecked cars have to be expected, and there are a good many heavy repair jobs on bodies and trucks, besides a certain number of motor and wheel changes. The number per year of the latter cannot be figured accurately, but averages can be approximated and made a closely adjusted part of the shop program.

Using the number of cars that must be overhauled per day, with the wrecks and other repair jobs arranged and classified as a daily output, it is necessary to work back into each department of the shop and figure out the number of repair jobs or amount of daily production that the department can turn out. Sufficient parts are needed to supply the demands of the cars scheduled out. The individual departments have, further, to be enough in advance of the cars due out to allow time for installation of the parts on the car.

To keep these departments working with a minimum of men and well-balanced production—that is, not overloaded one week and slack the next—a fair amount of extra or spare parts and apparatus is needed for a working surplus. To allow a department to become slack and temporarily to transfer men to some other department is inefficient and accomplishes little. With a properly figured out schedule there should not be any departments that could transfer men.

REPAIR WORK IS MADE UP OF REPETITIONS

Overhauling consists of dismantling, repairing, and replacing worn parts with new parts ready manufactured, and assembling. It cannot be placed on the basis of a manufacturing plant turning out a given product in which a given number of operations are merely repetitions. Yet with a comparatively few exceptions, operations in a repair shop are also repetitions. The difficulty of grouping these lies in changing from one job to another, but by building the schedule on the process required a very accurate shop program can be arranged. Such a schedule will place each department on a given performance and will indicate quickly what hours are productive and what are non-productive.

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*Formerly superintendent of equipment Kansas City Railways.

One of the principal factors in the balanced production of a department is the delivery of parts for repair and the necessary material and the routing of the repaired parts. Concentration and proper group arrangement will cut down very quickly the rehandling and lost time. The arrangement of the shop buildings frequently is responsible for double handling and back track moves. Even in existing shop buildings, a great deal can be done to reduce expensive movements.

A SMALL LABOR GANG CAN HANDLE TRANSPORT OF PARTS

It would seem better to keep the foreman and the men at the department location, and have all material movement under the control of one man with a small labor gang, using electric trucks and cranes to supply the wants of all departments on a regular schedule, than to have work interrupted while workmen, or even worse, foremen, fetch and carry.

To illustrate this point a car is placed on an overhaul pit, where it is raised by mechanical means and blocked in place. Trucks will be run out from under on their own power, and removed to truck overhaul pits by electric crane. Parts and apparatus will be moved to the various departments either by electric crane or electric trucks, and all repaired parts and apparatus returned in the same manner.

The entire material movement will be carried on under the supervision of one man. It is this man's business to see that the material movement is carried out without interference and that operations on the car body move steadily and without delays. During the process of overhauling the truck, for instance, the foreman of the truck department will issue storeroom requisitions for renewal parts, which he will turn over to the man in charge of material movement; and the material will be returned from the storeroom and delivered to the truck department by electric truck.

This system can be applied to a force of surprisingly small size. The returns in reduced labor costs and elimination of lost time waiting for materials will pay for the investment in trucks, etc., many times over. The effectiveness of a shop schedule can be much hampered by material movement. Replacing manual labor by quick-moving machinery will produce sure results.

FOREMEN AND INSPECTORS MUST KNOW THEIR JOBS

In stripping down and building up a truck the man who supervises the job and the men who accomplish the work must know how to turn out a truck with all parts having the same clearances, bearing surfaces, alignments, and standards as were set by the builder. The man who makes the final inspection must know whether the work has been done right. This applies to all parts of the equipment in the same way that it does to a truck, and the necessary precision with which the work is carried out depends entirely on the way the equipment is designed and built. In order to obtain results that will permit the equipment to perform the work it was designed to do, it must, after an overhaul, be reassembled just as accurately as when it was first built. There must be an exact adherence to adjustments, fits and quality of the parts replaced. A liberal use of accurate gages, thorough and intelligent inspection, careful testing, preceded by a thorough practical knowledge of results required, are needed in the individual operations just as much as schedules and system are needed to control production.

It follows that if a repair shop should be placed on a production schedule with the chief product an overhauled car, the organization and its control should be made up on the same basis, the supervisory force consisting of specialists with ample supervision.

No small factor in the efficiency of a shop is a plentiful supply of well-designed, high-grade, small hand tools and labor-saving facilities. A repair shop without them will waste time, because repair work necessitates frequent changes from one class of job to another and trucks, motors, and auxiliary apparatus are dirty, rusted, and greasy, consequently hard to take apart.

A good share of the work has to be carried on in a manner that makes it impracticable to use machine tools, and hand labor predominates, but it can be speeded up with high-grade power tools. Electrically-operated cranes and hoists, electric lift trucks, and devices of this nature, will always warrant the initial cost in time saved. Much time is lost removing grease and dirt in preparing parts for assembly and machine operations, and well-designed devices to replace hand labor will help costs materially. A lye vat large enough to take a complete truck frame is one of the best of these.

Plenty of light scientifically distributed, air, gas, electric current and water carried to every point where they have a possible use, with numerous outlets arranged to cut down waiting time and steps, are necessities and at the same time economical.

ORDER AND SYSTEM ARE ESSENTIALS

An editorial in the ELECTRIC RAILWAY JOURNAL of May 19, 1923, entitled "Orderliness and System in the Truck Shop" stated: "The general impression that one carries away from visits to most of these [shops] is one of disorder," and also, "Without doubt one of the least expensive improvements that can be made, and still one that will produce important results, is that of systematizing the work and maintaining an orderly truck shop." Frequently this can be applied not only to the place where trucks are being overhauled, but also to the entire shop. This results in a daily loss, because workmen feel the effect of disorder and dirt to the detriment of their performance.

The fact that aisles are blocked, or are not provided, parts are scattered, and floors are dirty and greasy, causes no small loss of time. It takes longer to move from one point to another on a crooked path than on a straight one, and longer to find parts if they are scattered than if they are placed for use following a thought-out plan to save time and movements. Much can be done with this idea alone. Good workmen do not live in dirt and disorder at home, and they do not like to work in it. Such conditions are pretty sure to cause the workman to slow down and to become careless of his time and the company's property. Temporarily discarded parts or half-finished jobs allowed to lie around on floors and under benches day after day will have the effect of making him more or less indifferent, because he rather logically figures out that if the management can afford to allow parts that are clearly of value to kick around with apparently little thought as to their ultimate use it is no affair of his. He also is very likely to treat as inconsistent constant cautions to practice economy and prevent waste.

There is nothing that will kill the interest and efficiency of good workmen so quickly as to allow plant equipment to run down and get out of repair. It is no more consistent to expect a shop force as a whole to produce good results with a plant in which tools and equipment are generally in need of repair than it is to expect an individual workman to unbolt a suspension bar with a worn-out wrench.

Many old shops can, without the outlay of a great deal of money, have their operating costs reduced and their production increased by adopting some of the methods, systems, and facilities already developed by out-and-out manufacturing concerns, who would not even consider repair work. On the other hand, many repair shops are engaged in more or less comprehensive programs of manufacturing renewal parts, with the idea that economies are being effected, while everything about their organization and plant would indicate that this feature of their operation is hopeless competition, and that they have been drawn into it either through the difficulty of obtaining renewal parts from the manufacturers or because they do not know their actual costs.

To quote again the ELECTRIC RAILWAY JOURNAL of May 19, the editorial headed "Good Savings by Improvements in the Old Shop" states that "Many operating officials consider the shops a necessary expense and look with little sympathy on any proposal to put more money into these facilities," which is not only true but states the case rather mildly.

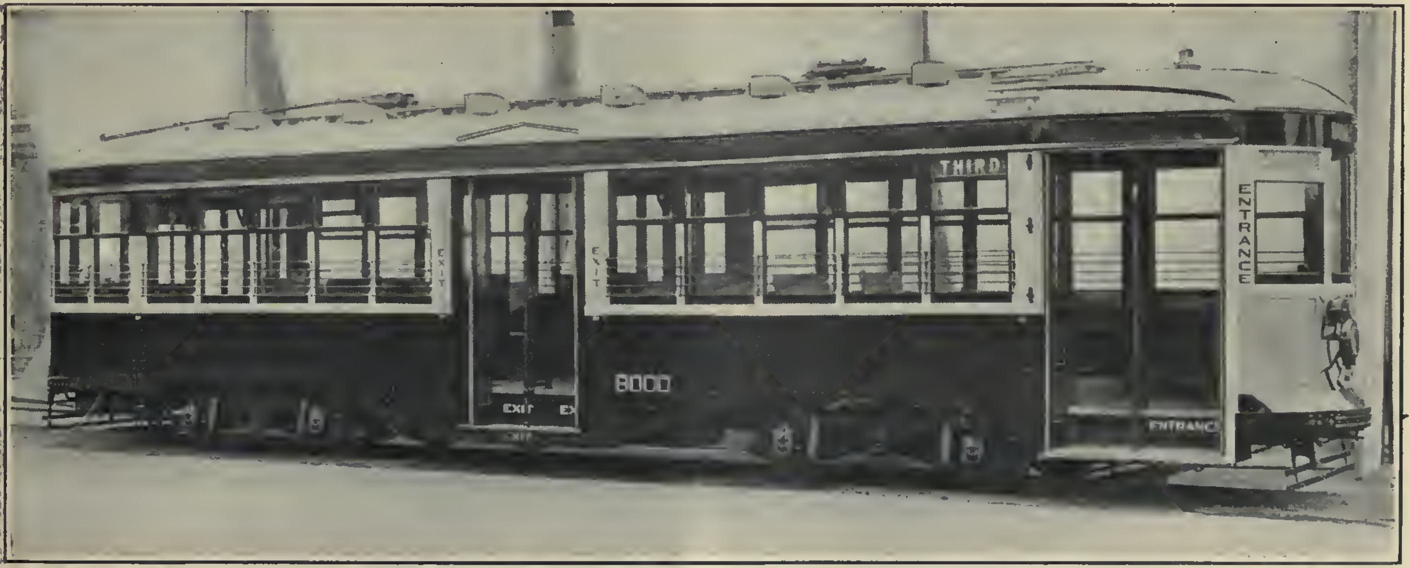
There are real opportunities for economies in the mechanical departments of electric railway properties. The shops offer fertile ground, and the head operating official will find it profitable to give this department of his road closer scrutiny.

Double-End Pay-as-You-Pass Car Introduced in Brooklyn

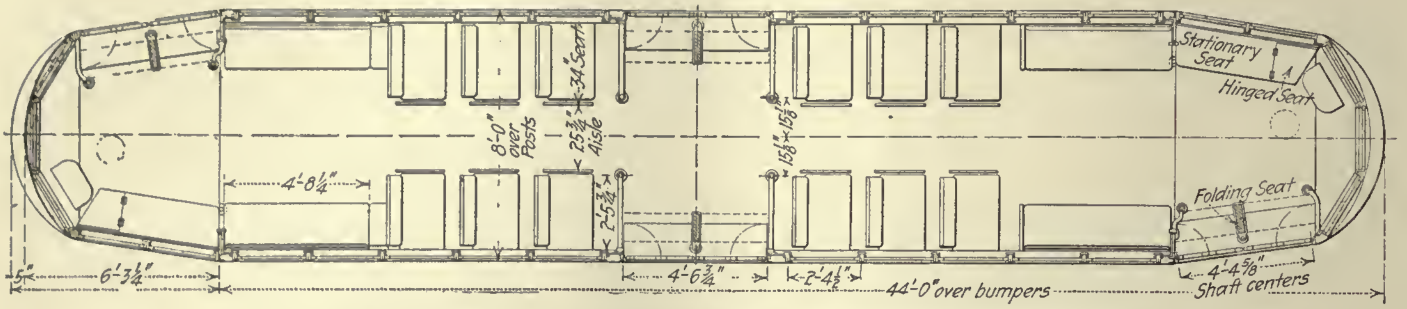
Two Hundred Cars, Just Being Placed in Service, Are Arranged for Front Entrance and Center Exit — Novel Scheme of Exterior Painting Attracts Attention—Variable Load Brakes and Electro-Pneumatic Door Control Are Used

A NOVELTY in merchandising transportation is being used by the Brooklyn City Railroad as a means of introducing its new front-entrance. center-exit cars. Between the belt rail and the bumpers the dash is painted peacock blue, and from the headlight as a center there extends a striking spider web of yellow and red, as shown in an accompanying illustration. The purpose of this unusual color scheme is to draw the attention of the public to the new cars. Posters in every car operated by the Brooklyn City Railroad will explain a couple of days in advance about the introduction of the new type cars, and when they actually appear on the street arrayed in these brilliant colors they will stand out conspicuously in contrast to all other cars in the city. The public will therefore more readily grasp the fact that the Brooklyn City Railroad has put 200 new cars into operation. At the same time this color scheme has a practical value in that it will inform prospective passengers when the approaching car is of the front-entrance type. This is important because there are no other front-entrance cars in Brooklyn, except the safety cars.

First deliveries of these cars are now being made and it is expected that they will be placed in service early in November. The cars are of the double-end type with front entrance and center exit, designed primarily for two-man operation in heavy city service, although they are so equipped that they can be operated by one man, if it is desired. When the car is operated by two men, the conductor stands in the middle of the car, near the



The First of 200 New Double-End, Front-Entrance, Center-Exit Cars of the Brooklyn City Railroad



By Using All Available Space a Seating Capacity of Fifty-three Has Been Secured

center exit, and the passenger pays his fare as he passes on his way to the exit or on his way to the rear half of the car. This arrangement has been adopted with the idea of speeding up passenger movements.

FEATURES OF UNDERFRAME DESIGN

Clearance is always a serious problem in the design of a street car for service in Brooklyn. The location of pillars of the elevated railway structure, especially the location of columns at the ends of the Brooklyn and Williamsburg Bridges, is such as rigidly to limit the length and width of surface cars. Small clearances exist also on several other city-owned bridges. Inasmuch as the new cars are designed for heavy city service, it was desired to have them of maximum size, and it is claimed that not a single inch could be added to the over-all dimensions of this car without causing trouble where the clearance is small. The length is 44 ft. over bumpers, with truck centers 21 ft. 6 in. The width over all is 8 ft. 3 in. Each platform is 6 ft. 3¼ in. long. By tapering the platform from its maximum width at the bulkhead to a width of only 6 ft. 8 in. at the vestibule corner posts it has been possible to design a car of this size without exceeding the clearance limit.

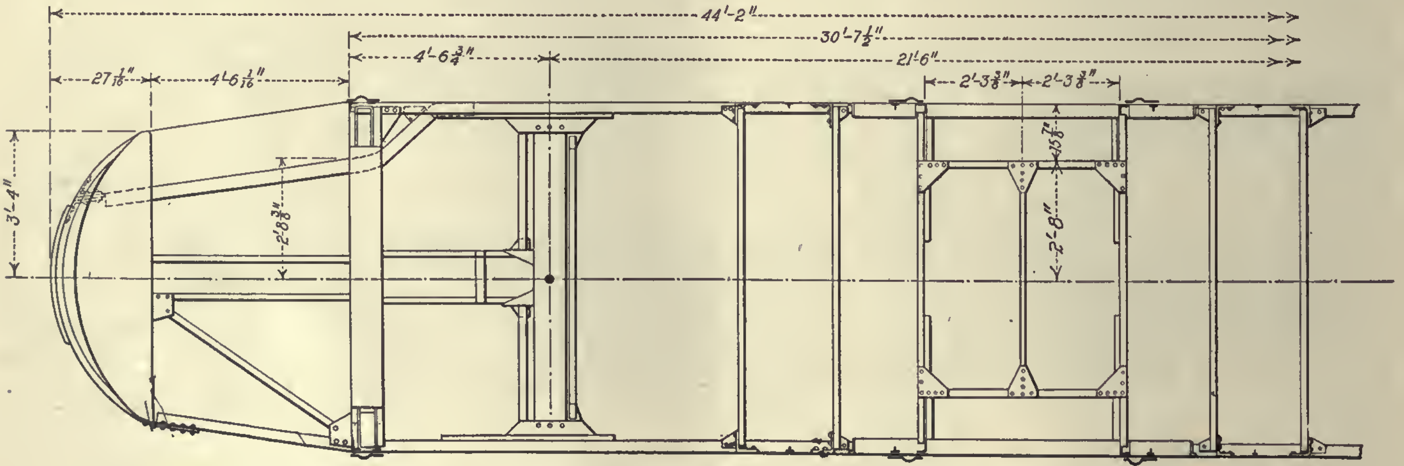
In order to keep within the desired dimensions the front step is built into the platform, forming a well into which the doors fold and eliminating any outside folding step. This has necessitated the design of an unusual platform knee on the near side of the car. The knee bends inward toward the center line of the body from a point slightly inside the bulkhead and passes behind the step well, as shown in the accompanying drawing of the underframe.

The steps for the center-exit doors are similarly within the lines of the car body. A well has been made on each side 16 in. wide and 4 ft. 6¾ in. long. The center cross sill is shortened and framed with steel channels running lengthwise between the adjacent cross sills. On each side of the car two strap brackets attached to the cross sills on each side of the center support the exit step. Feralun is used for all step treads and edges of the floor.

To secure the maximum seating capacity in a car of this type, an unusual arrangement has been adopted. There are twelve transverse seats in the center of the body, six on each side of the center exit; two longitudinal seats at each end inside of the bulkhead and a permanent seat on the left side of each platform. A folding seat of special design is used to cover the door openings not in use. This is a collapsible seat hinged in the middle and the two halves may be folded together until they meet. The seat may then be slipped down into a pocket, the process somewhat resembling that of slipping a book backward into a bookcase. This arrangement eliminates any chance of the seat falling down while a passenger is sitting on it because it is entirely independent of any supporting legs or similar device. Each car is equipped with four such seats, one for each center door and one for each platform door. When the car is in service the seats on the near side are collapsed and slipped back into their pockets, forming divisions in the center of the entrance and exit passageway and insuring a double stream of passengers. The seats on the far side are unfolded and put into service.

PREFERENCE FOR WOOD SEATS

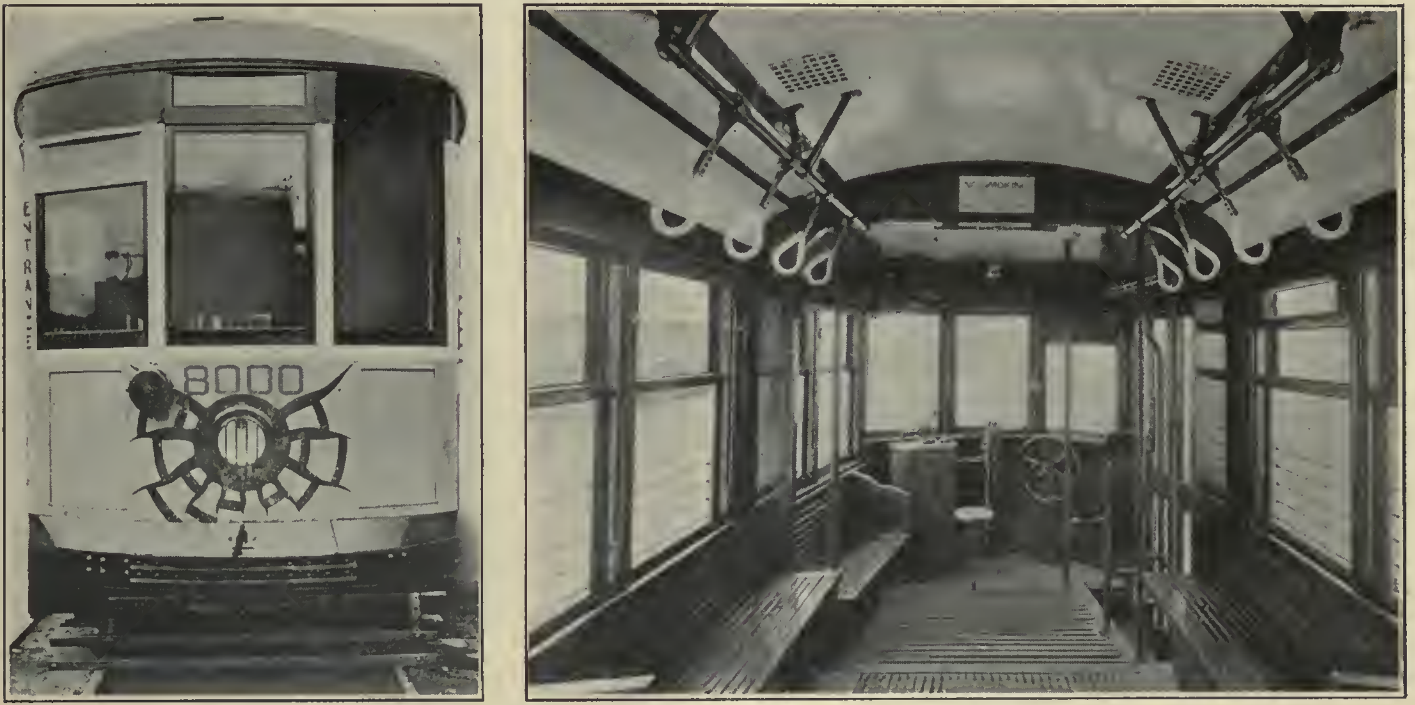
An interesting investigation was made by the company before deciding upon the material of the seats. Officials made trips at various hours of the day to different parts of the system and inquired of passengers on the cars what kind of seats they preferred. It was rather expected that some type of covered seat would



A Feature of the Underframe Design Is the Platform Knee on the Near Side Which Passes Behind the Step Well find considerable favor. It was thought also that the passengers would be likely to express preference for the particular kind of seat used in the car in which they were riding at the time the question was asked. But neither of these things occurred. The officials say that the passengers favored wooden slat seats. Inasmuch as the company has found this type of seat to be desirable, not only on account of the economy of maintenance but also on account of sanitation, it was entirely ready to accept such a verdict from the riding public and all of the new cars have cherry slat seats.

ORDER WAS SPLIT BETWEEN TWO PLANTS

Of the total number of cars being built, 100 are under construction at the Philadelphia plant of the J. G. Brill Company and 100 at the plant of the St. Louis Car Company. The cars built by the two different car builders are identical in construction. Duplicate prints of the same drawings were supplied to the car builders, covering all details of the car. Both lots have Brill 77-E-1 trucks with 26-in. rolled steel wheels.



Left—To Attract Attention the Dashes of the New Cars Are Painted Peacock Blue with a Red and Yellow Cobweb Effect in the Center. Right—The Entrance Doors Open Inward into a Well. On the Opposite Side of the Platform Is a Permanent Seat

Although the cars are of steel construction throughout, the weight has been kept down below 37,500 lb. The side sheeting is 0.25 per cent copper bearing steel. The use of copper bearing steel in place of the ordinary metal adds approximately 15 per cent to the cost of the sheeting, but it is thought that rust-resisting material will have a longer life that will more than repay the greater initial outlay. Climatic conditions in Brooklyn are particularly difficult on account of the nearness of the ocean and the fogs which carry minute particles of salt. This results in considerable corrosion of ordinary steel. The only wood used in the car interior is that in the floor, seats, doors and sash.

The vestibule posts and vestibule carlins are of wood in contrast to the steel posts and carlins used elsewhere in the car. This arrangement has been made, as shown in the accompanying illustration of a partly completed car, so that in case of collision the whole frame will not be injured. The hood not being integral with the car body, it can be easily and cheaply replaced after being damaged in an accident.

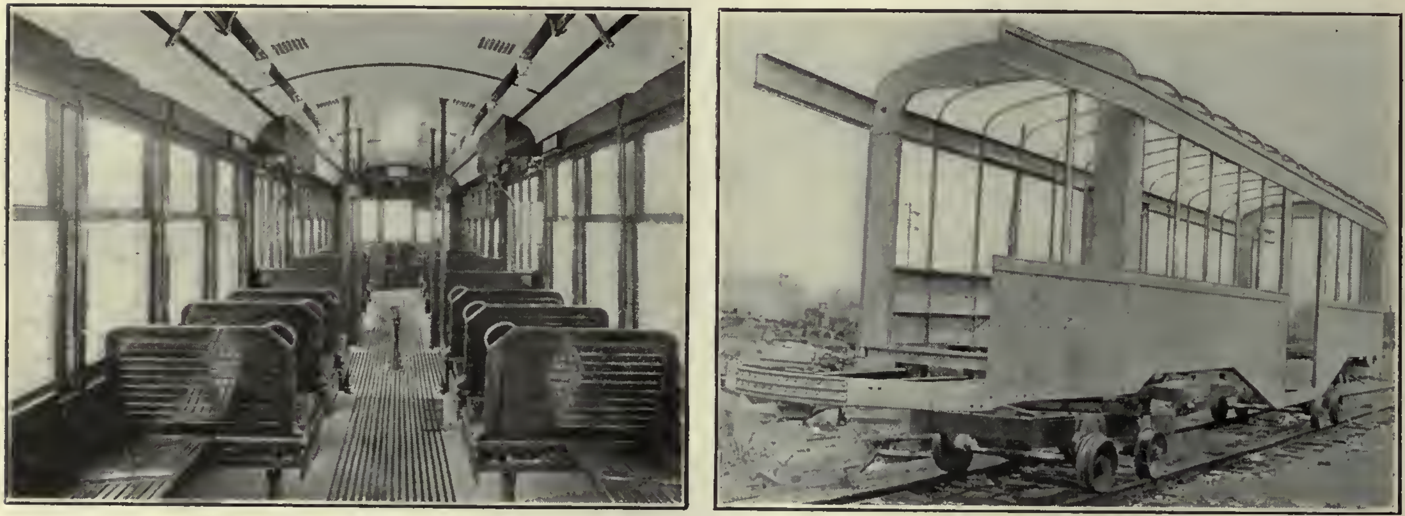
Of the cars 100 are equipped with four Westinghouse No. 510-A 35-hp. motors and the other 100 have General Electric No. 265 motors of the same capacity. The control is K-72-A for all of the cars. This controller differs only slightly from the well known K-35, but has two extra contacts at the bottom for use in connection with an electrically operated fare box. The control is interlocked with the line switch under the car. The motors are not interchangeable between the cars built at the different shops. Through the co-operation of the motor manufacturers, however, it has been possible to make the gears interchangeable between the two types of motors; that is to say, Westinghouse gears will work with General Electric motors, and vice versa.

Westinghouse variable load brakes are being used for the first time on surface cars in Greater New York. A spring-actuated valve controls the admission of air into the brake cylinder. The position of this valve is governed by a rod which extends from the variable load device to the truck bolster. A cam on the truck bolster is connected with the rod and on the truck transom below the cam is a knife-edge contact. The cam is not fixed rigidly to the truck bolster but is lowered into position only when air is admitted to the opening of the door engine. When the car is stopped and the door is opened this contact edge touches the cam. If the total weight of the car and its load varies as passengers board or alight the spring-actuated valve of the brake cylinder is reset in another position. By this means the amount of air admitted to the brake cylinder by the ordinary application of the brake handle is varied according to the weight of the car and its passenger load when the last stop was made. A braking efficiency of 100 per cent at all times is attained by this apparatus. The hand brakes on the new cars are of the Peacock staffless type.

Standard safety devices are installed on the new cars and electro-pneumatic control is used on the center doors. These center doors are operated from the conductor's position by a push button. The door-operating mechanism is located above the doors, as shown in one of the accompanying illustrations, thus giving more floor space and insuring the apparatus against freezing in cold weather. The door-operating mechanism is manufactured by the Consolidated Car Heating Company. The front door is interlocked with and operated by the motorman's brake valve as usual with safety car equipment. All the doors are interlocked with a line switch to prevent the car starting before the doors are closed. A counter emf. relay is in circuit with the door control to prevent opening the doors when the car is traveling faster than a certain predetermined speed.

Fare Boxes Electrically Operated

Johnson type J electric registering coin boxes are used, together with International R11 registers, solenoid-operated. This apparatus is described elsewhere in this issue of Electric Railway Journal. When the car is in use with two men the fare box is located on a pedestal in the center of the car, but when it is being used as a one-man car the fare box will be moved to the motorman's end.



Left—When the Car Is Operated by Two Men the Fare Box Rests on a Pedestal in the Center of the Aisle. Right—The Steel Work Does Not Include the Hood. This Is Built of Wood for Greater Ease of Replacement if Damaged in Collision

Mahogany finish is used for the interior woodwork and statuary bronze for the metallic trimmings. The cars are heated by Gold electric heaters controlled by Utility thermostatic heat regulators. The roof is of the arch type, equipped with twelve Utility honeycomb ventilators, and lined with white Agasote in one-half the cars and white Nevasplit in the other half.

Artificial illumination is supplied by two rows of small unshaded electric lights placed approximately over the center line of the cross seats. There has been in the past considerable trouble in Brooklyn from stealing of lamps and headlights. When designing the new car, therefore, particular attention was paid to this and a lock was selected which would prevent theft. General Electric lock sockets are used for the lamps. The lid of the headlight is of wire glass locked by a special eccentric key.

Hand straps are the same as used in the subway cars, porcelain enameled handles, Rico No. 5. Curtains are Pantasote. A new type of trolley catcher, which is described elsewhere in this issue, is used on the cars. It is similar to the ordinary type manufactured by the Ohio Brass Company, but has a novel lubricating device incorporated in its design.

An unusual feature of the arrangement of signs is that all of them are at the front end of the car. Hunter signs are used entirely. One is in the center of the letterboard above the middle front platform window, one is at the top of the near side platform window and a third is at the top of the first side window on the near side of the car. The other end of course duplicates this arrangement. The first and third of these signs indicate by name the route on which the car is running. Only the sign in the right hand platform window indicates the destination.

The general color scheme of the new car is the same as that which the Brooklyn City Railroad ordinarily uses, the base color being aurora red and the trimmings citron yellow. On account of the narrow streets in Brooklyn much trouble has been occasioned in the past by wagons scraping the paint on the sides of the cars. In order to avoid this each new car will be equipped with eight small guards. These are nothing more than vertical strips of pressed steel riveted at the four corners of the car body, and on both sides of each center door extending up to the belt rail. The strips project 1½ in. beyond the steel side sheets and it is expected that they will hold away any vehicle that may brush against the side of the car and prevent it from scratching the body paint.

New Car to Be on Display

The first car to be delivered will be placed on public exhibition Nov. 1 on a siding near the Brooklyn Borough Hall. Alongside of it there will be one of the old horse cars used many years ago. Placards will draw the public's attention to the fact that the old horse car cost about $650, whereas the new steel car cost approximately $15,500. In spite of the greater cost of the modern car the fare is now 5 cents instead of 8 cents, which the horse car charged, and the haul for a single fare is considerably longer. The public is invited to inspect this car and familiarize itself with its novel features before the company places it in regular service.

Crane Car Built for General Utility Work

A Work Car, Rebuilt Into a Crane Car, Has Provisions for Hoisting, Transporting Heavy Loads and Supplying Compressed Air—Also Used as a Snow Plow

FOR handling and transporting heavy railway parts a crane car is the best equipment available. The addition of a few special devices makes the car useful for many other purposes, so that it can be kept in almost continuous service the year round. Such a car proves a real labor and time saver.

A double-end crane car combining many novel and useful features has been reconstructed by the Lehigh Valley Transit Company, Allentown, Pa., from an old work car that had a limited application. The cab of the original car was located in the center, and the framing was comparatively light.

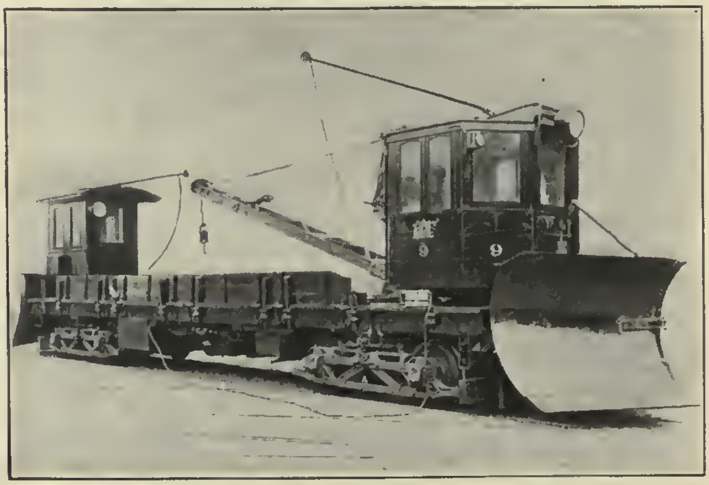
In the rebuilding of the car the center cab was removed and placed at one end as a stationary cab, while at the other end of the car a revolving steel cab was built to house the control mechanism for operating the car and for a jib crane. The underframing also was strengthened by the addition of steel members placed to provide for the additional strain incident to the work for which the crane car is suited.

The crane has an 18-ft. boom, constructed of 8-in. channels with a connecting steel lacing. The total reach from the pivot to the hoisting cable is 22 ft. The boom has steel jaw bearings resting against a 3-in. pin which is welded to the rotating base. The boom is raised or lowered by a hand windlass to adjust the height. This height seldom needs to be changed, as the rotation of the cab and the backward and forward movement of the car itself provide sufficient adjustment for nearly all classes of work. The boom can be removed easily, and a covered pocket is provided in the car floor, so that the crane car can be converted into a double-end work car on short notice, with the boom concealed and out of the way.

The revolving cab is built entirely of steel, and all the main members, the center frame and the sheet steel sides are electrically welded, bolts being dispensed with except where removable pieces are required or provision has to be made for the substitution of repair parts. The cab and the frame supporting the boom revolve around a heavy center pedestal which is supported entirely from a steel pivot cap.

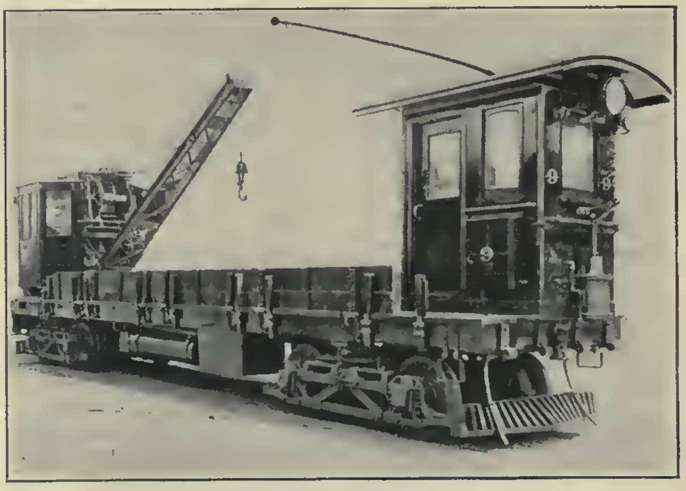
At a distance of 1 in. above the rotating base of the cab a stationary false floor is attached to the central pedestal. On this stationary floor are located the operating mechanisms, comprising the controller, air-brake valve, hand brake, whistle, air gage, sander and gong. The wiring, air pipes and hand-brake chain go through the center of the pedestal, which is hollow. The headlight equipment, lightning arrester, circuit breaker and electric tail lights are attached to the outside of the rotating cab, receiving power through a contact ring located in the roof.

The hoisting cable travels over a pulley located at the end of the boom and another pulley at the top of the cab, whence it goes through the hollow central pedestal to a pulley located underneath the floor and thence by a double cable to an Ingersoll-Rand 4,000-lb. air hoist. Three speeds and capacities of the hoist are available. By attaching the hoisting cable direct to the double cable, the 4,000-lb. lift is obtained at normal speed of operation. By placing the cable around a pulley at this point and attaching one end of the hoisting cable to a fixed hook located on the bolster, a 2,000-lb. lift at high speed is obtained. By passing the end of the cable through a sheave at the hoisting end, and attaching this to a hook located on the boom, an 8,000-lb. low-speed hoist is obtained. The normal lift of the cable is 19 ft., making it possible to attach the hook to a heavy article 40 ft. from the center of the pedestal.


Provision Is Made for Use as a Snow Plow in Severe Storms

Rotation of the hoist and cab is obtained through the use of a cable passing around a 4-in. channel ring which is located underneath the cab. The cable leads through pulleys underneath the car to a second Ingersoll-Rand 4,000-lb. air hoist. One end of the cable is attached to one drum of the hoist and the other to the opposite drum, being connected so that one cable is winding while the other is unwinding.

The air hoists used for operating the crane are of the type usually employed for shop use on carriers or booms, and are controlled by means of chain pulls. These controls have been removed, and electrically operated air valves, such as are used in the Type HL electropneumatic control, have been substituted. There are three stations from which the hoists may be operated to raise or lower and rotate the boom. One is on the pedestal in the rotating cab, one is near the rear window in the stationary cab, and the third is on a cable which may be plugged into a receptacle located underneath the car sill. These controls are ordinary contact switches, similar to those used in the car signal system of this


The Position of the Boom Is Adjusted by Means of Air Hoists

company, each being built up of fiber with a small operating lever projecting, as described in the ELECTRIC RAILWAY JOURNAL for Sept. 1, 1923. Two switches, one for the hoist and the other for rotation, are provided at each operating station.

Before the hoist can be moved it is necessary to release the cab lock, which is operated from inside the cab. It is made up from ¼-in. steel plate which drops between stops on the floor. When the lock is raised clear of the stops a contact is made completing the control valve circuit so that operation of the air-valve switches is possible.

In order to steady the car when extremely heavy hoisting is done, and where there is danger of the car overturning, an outrigger is provided. A 6-in. I-beam, 8 ft. in length, is located in a roller pocket beneath the car floor, and may be pulled out on either side of the car. Hinged to the end of this beam is a 4-in. x 4-in. wooden block which folds up when not in use, but which fits directly under the end of the I-beam when pulled out, thus providing a sturdy brace which steadies the entire car while hoisting.

For winter service plow noses can be attached at either end of the car. These noses are adjustable through the use of simple raising levers actuated by 10-in. brake cylinders, which are installed outside the cabs, gravity sufficing to lower them. It is necessary, of course, that the rotating cab be locked in its normal position when using the snow plow on that end. Drawheads of cast steel are welded to the snow noses, so that there are no bolts or rivets in the drawhead. It is stated that these snow noses can be installed or removed within thirty minutes.

The air supply for brakes and hoists is obtained from a General Electric 130-A compressor, having a capacity of 50 cu.ft. per minute. Pipe attachments are provided so that pneumatic tie tampers or pneumatic concrete breakers can be operated from the supply of air provided by the car.

The main operating motors are controlled by K-28 controllers, with automatic reclosing line switches located beneath the car. An automatic cut-out is provided to prevent over-travel of the hoisting and rotating cables, shutting off the engines as the cables approach the limit of their movement.

For use at night, 94-watt portable incandescent headlights are installed on either side of each cab, and a five-light cluster, mounted on ¾-in. fiber, is located at the end of the boom. The cluster is easily removable, and the fiber protects the boom from accidentally coming in contact with the trolley wire.

The trucks were designed and built in the company's Madison Street shops, and all castings were produced in the company's foundry except side frames and journal boxes. These have given good service for more than two years, having been installed before the conversion of the car.

The car was designed by M. C. Garlick, supervisor of the Easton division, and was constructed under the supervision of W. C. Klein, superintendent of equipment

The Readers' Forum

Interchangeability and Standardization

DEPARTMENT OF COMMERCE
OFFICE OF THE SECRETARY
WASHINGTON, Oct. 18, 1923.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL for Sept. 29, 1923, we note on page 520 your most interesting article on "Interchangeability and Standardization." We are particularly impressed with your remarks on page 521, beginning, "Standards of the type discussed may be established for a great variety of parts . . . ." This prompts us to ask your opinion regarding the possible usefulness of this division to the car-building industry in bringing about a reduction in the present variety of sizes and dimensions of many of the items enumerated in this paragraph.

We have co-operated with many different groups in reducing variety and find that our procedure offers a relatively short and effective method for obtaining satisfactory results. This does not interfere with the work of other groups, but, in fact, clears the way so that their standardization work can be carried on more effectively.

The inclosed bulletins by the U. S. Chamber of Commerce, which body is co-operating with us, show some of the things which have been simplified under the procedure referred to.*

Our point of view is that many of the items in present use do not need to be superseded by new or radically different types as standards, but instead, that present production and use could be concentrated on those articles of proved greatest demand or usefulness and that the other items which are not in such universal favor can be dropped or discarded.

We would like to have your views on this preliminary phase of standardization as applying to this particular field.

DIVISION OF SIMPLIFIED PRACTICE,
BY R. M. HUDSON.

[The editors replied that they believe there is an opportunity for this division of the Department of Commerce to contribute a very helpful influence in the work already under way in the American Electric Railway Association which might result in a much quicker accomplishment of the desired end. The matter was referred to President H. A. Johnson and Executive Secretary J. W. Welsh of the American Electric Railway Engineering Association for consideration.

The work of the Division of Simplified Practice is primarily to bring about a reduction of the great variety of types or styles of any article required by the trade. This is in the direction of standardization, though quite different from the program of standardization that has been followed by the A.E.R.E.A. It is distinctly a step toward securing greater interchangeability, which was one phase of the discussion in the article referred to in the Annual Convention Number. For example, if the thousand and one simple items on a car that are manufactured to perform a certain simple function, but are each made slightly different by each manufacturer, could all be manufactured to conform to a very few designs of each piece, what a help that would be to the railway company which has to stock spare parts for every design of every article used on all of its cars, in order to be prepared to make replacements.]

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*In this bulletin, among a long list of similar accomplishments in various fields, there appears the following items: The number of varieties of steam railway car wheels required was reduced from 175 to 4; dry cells from 17 to 6; hammers, axes, etc., from 2,752 to 761; lamp bases from 179 to 6; paving brick from 66 to 7; tires from 287 to 32; wheelbarrows from 42 to 16, etc.

Equipment Maintenance Notes

Removing Wheels from Transfer Table Axles

By H. Cowen
General Foreman New York Railways, New York, N. Y.

WHERE electric railways shops are equipped with transfer tables, it is most important that they be maintained in proper repair at all times, in order to anticipate emergencies and prevent unexpected breakdowns. Renewals of motor equipment and control parts can readily be taken care of, but the replacement of broken wheels or axles usually is a very difficult proposition and one that consumes considerable time. In order to prevent tying up the transfer table over an extended period, some railways provide spare axles and wheels so that these may be inserted without delay.

The transfer table axles at the Fiftieth Street shop of the New York Railways were too long to be accommodated in the wheel press, and for many years wheels were removed and replaced by hand pumping. In this operation the cylinder, ram and yoke were removed from the hydraulic axle straightening press and an arrangement with two 1½-in. diameter tension rods fitted with end and intermediate tie yokes was used as shown in the accompanying diagram.

The hydraulic pressure used for removal of the wheels was provided by hand pumping, which constituted a part of the standard cylinder of the straightening press. When carried out by this means the job required four shop men and generally took from eight to ten hours to replace two wheels. The pressure used for pressing on was about 40 tons. Not only did this method require an excessive amount of time, but it also proved very tedious and trying on the men, who considered it as a "man killer," but were loyal and conscientious enough to tackle it whenever occasion demanded.

In order to improve on this tedious method and to reduce the expense involved in performing the work, connection was made to a hydraulic plunger pump located near by. This pump was attached to a 250-ton wheel press and a connection was made between the pressure cylinder and this pump by a ½-in. pipe. The tie rods and separators were assembled in the same manner as previously used, but the electrically driven pump furnished the hydraulic pressure. As a result of this, the time for renewing two wheels was reduced to two hours, and two men could take care of the job without difficulty. The composite saving, therefore, amounted to thirty-six man hours, and in addition the men were not overtaxed and emergencies were promptly met as they arose in the transfer table operation.

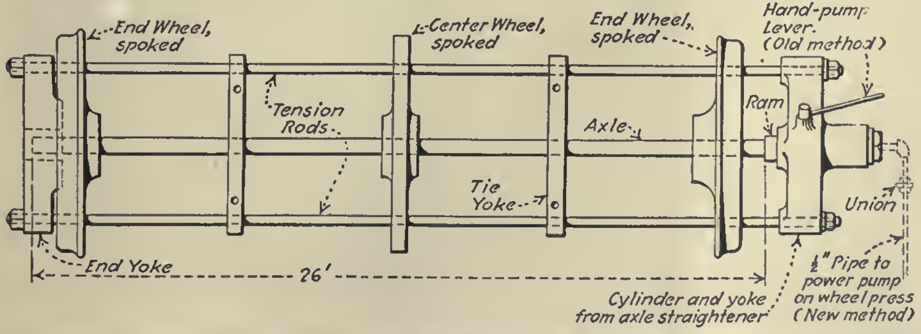

End Wheel, spoked
Center Wheel, spoked
End Wheel, spoked
Hand-pump Lever. (Old method)
Tension Rods
Axle
Ram
Tie Yoke
Union
End Yoke
26'
½" Pipe to power pump on wheel press (New method)
Cylinder and yoke from axle straightener

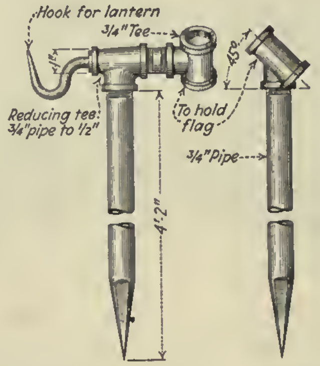
Diagram of Equipment for Stripping and Assembling Wheels on Transfer Table Axles

Pipe Staff for Flag and Lantern Signal

By Clifford A. Elliott
Engineering Department Pacific Electric Railway, Los Angeles, Cal.

THE Pacific Electric Lines found it necessary to provide a standard staff for flag and lantern signals used as a protection during track repairs. The rules of the road require foremen to place proper protection signals in advance of any work being carried out. These signals consist of a yellow flag during daylight periods and a lantern at night.

The staff used for supporting these signals is made of ¾-in. pipe with two tees, a nipple and a hook at the upper end. The upright is 4½ ft. long and is pointed at the bottom so that it can be readily placed in the ground. A reducing tee ¾ in. to ½ in. is screwed to the upright. The small end of the tee is bushed and a 1-in. iron hook is provided for hanging a lantern. A nipple is screwed into the ¾-in. end of the tee and another standard ¾-in. tee is screwed to this. This latter tee forms the support for the flag. The tee for holding the flag is placed at an angle, as it was found that this was most suitable for giving trainmen an unobstructed view of the flag. An accompanying illustration shows a flag in position.



Efficient Flag and Lantern Staff Used by Track Department of Pacific Electric Railway

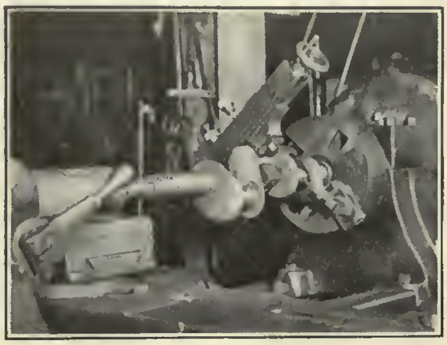
Flag Signal in Position for Signaling Traffic

Grinding Air Compressor Cylinders

By O. A. Norene

Assistant Master Mechanic Omaha & Council Bluffs Street Railway

AIR compressor cylinders when badly worn or scored were formerly bored, bushed and reamed to standard size, a practice that was not very satisfactory. At present we are grinding worn cylinders and fitting them with oversize pistons. Two two-piece double-seal piston rings are fitted on each piston. Most of our compressors are ground to 0.020 in. oversize.



Re-turning Tool for Truing Up Crankshaft

Crankshafts are tested and bearing surfaces are trued up with a No. 1 Weber crank pin re-turning tool. With this type of tool, a crankshaft can be trued up in a very short time. Compressor suction line strainers are located inside of the car in one of the seat pedestals. This has eliminated, to a great extent, the collection of grit and dirt in the crank cases of compressors, which we were having when strainers were located underneath cars.

Level Board for Track

By J. S. Wilder

Engineer Maintenance of Way, Municipal Railways, St. Petersburg, Fla.

THE ordinary track level board which can be bought ready made is often heavy, awkward to handle and sometimes inaccurate. A much more satisfactory one can be very cheaply made in the railway shop. A graduated level having a movable shield to protect the glass, such as are to be found in machinists' iron levels, can be bought without the iron frame. By inserting a screw at each end of the level it can be very conveniently attached to a 5-ft. stick. A small square of sheet rubber packing is placed under each end and the screw passes through the center. This permits a slight adjustment to be made with a screwdriver.

The stick for the level board is made out of any convenient wood which does not warp too badly. A handy size is 1¼ in. x 2¾ in. x 5 ft. Both ends of the stick are shaped, It is planed to the desired size and laid out in the sun for a couple of days to season. If treated with oil it will warp less readily.

With such an apparatus, a difference of 1/16 in. from level on track will show a movement as great as ⅛ in. in the glass. While such accuracy is hardly needed in ordinary work, nevertheless it is sometimes of great convenience. Moreover, the marking of the track gage on the stick often saves time in making measurements.

What They Saw at Atlantic City

General Manager of Small City Railway Thinks $500 Well Invested—Representatives Present Preliminary Reports with Practical Suggestions for Improvement

"NOW while you fellows are drinking your coffee and lighting up the cigars which Charlie Riter is going to pass around, we'll get down to business, for I don't like these noon conferences to last too long." The speaker was William Redfield, general manager of the Jinxville Electric Railway, and the occasion was a luncheon meeting of his staff to listen to and discuss reports from the company's representatives at the Atlantic City convention of the electric railway associations.

"Sorry I couldn't go to Atlantic City this year. You know I was laid up with that lumbago I got the wet night we were out trying to get the crowds home safely after the county fair. John O'Neill and Bill Gainway made a good team, however, and we'll hear from them. You're first, John."

The superintendent of overhead, thus called upon, gave an account of the trip from Jinxville to the seashore and then said: "Of course I noted first the line materials. I was struck by the new things in overhead frogs. I think we can keep our trolley wheels on the wire better if we use up-to-date frogs with long approaches and no sharp angles. Then I learned a lot about automatic substations. I want to take up with you, Mr. Redfield, a plan for using one or two of them on our suburban lines. Tom Fairweather, our worthy roadmaster, would have been interested in a batch of broken rail joints that I saw; broken in a testing machine. Tom, it's up to you to know what that committee on welded rail joints is doing. Your joints will stand a little improvement.

"Another thing that struck me, fellows, was the fact that we're going to get the Engineering Manual in bound form. Our loose-leaf copies are always incomplete and out of date. Maybe it's our fault, but that's the fact. One thing more before I sit down. While I don't know much about car equipment, I think these new door-operating outfits are great, and I was glad to see that treadle-operated door that we've read so much about lately. That's all I've got to say today."

"Good speech, Johnny," was the general remark as he sat down. Mr. Redfield then called on Gainway, asking him to be brief as O'Neill.

"I'll cut it short all right, Chief; don't worry," was the rejoinder from the burly superintendent of transportation. "I'll second all John says and more about the interesting things we heard and saw. I'm sorry the whole bunch couldn't have been there. It was great.

"Now for some things John left for me to say. Did anybody say "buses?" You ought to have seen 'em—buses everywhere. It seemed like a bus convention in many ways. We've got to have a few here, Mr. Redfield. I'm sure I can sell you the idea. But there was a lot for my department besides buses. Take accidents, for example. The claims fellows are getting their grip on this thing and we operating men must cooperate with them. I heard a lot of good stuff about managing men, too. It all comes down, in my opinion, to treatin' 'em square. No coddlin', just a square deal. I noted that the claims agents and accountants are getting busy on ethics. It won't hurt any of us to be a little particular about such matters. Now when we get together again I want a little more time. I see the chairman winkin' at me so I'll sit down. No applause, please.

"Wait a minute, Mr. Redfield, one thing more. You know we talked about pull-ins, lately. Well, a chap from Memphis named McWhorter gave a report on that subject that struck me as a transportation man. It seems a lot of the master mechanics down South have a competition on pull-in records. They're getting great results. Wish we could get in on that."

"Well I'm glad we spent $500 sending John and Bill to Atlantic City," said Redfield, rising. "It's a good investment. But if we are to make the most of it we must change our practice here and there as our new information shows that to be desirable. I want John and Bill to call attention to anything they see around here that does not come up to the standards of the Atlantic City convention. We'll make improvements as fast as we can afford to make them.

"The meeting's adjourned."

New Equipment Available

Fare Register and Coin Box Electrically Interlocked

On the new cars of the Brooklyn City Railroad, described elsewhere in this issue, fare collection will be accomplished by means of a Johnson type J coin box and an International R-11 solenoid-operated overhead register.

A fare box as shown in the accompanying illustration is mounted on a pedestal in the center of the car. The passenger deposits his fare in the slot where it drops by gravity into a position making an electrical contact which operates a magnet. When this magnet is energized, it lifts a plunger which closes a second electrical circuit connecting with the overhead register and pushes the coin onto an inspection tray. The register is mounted on the inside of the bulkhead and is the usual type of International register with a simple magnetic actuating device attached to the rear.

An Electric Actuating Device Is Attached to the Rear of the Register

The box is designed to receive either nickels or dimes, registering one fare for a nickel and two fares for a dime. Double registration for a dime is accomplished by allowing it to drop into a second and lower position, where the circuit is again closed. The nickel, being larger, will not drop into the lower position, but passes immediately to the tray. In the side of the box is a glass window so that the conductor can tell at a glance what coin has been put in the box. After registration the coin drops into a return chute, where it is available to the conductor for making change. The apparatus is adapted for use where there is a straight 5-cent or a straight 10-cent fare, or where all fares are paid by the use of a token of some uniform size.

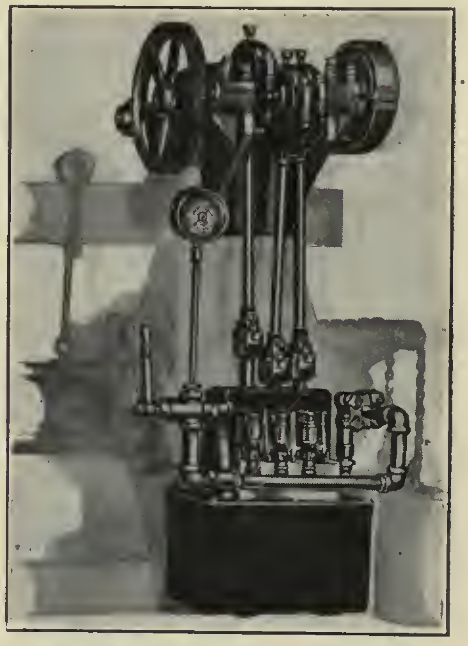
A Window in the Side Permits Conductor to Inspect the Money

New Pump for Wheel Presses

A new pump has been developed by the Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, for use with its wheel presses. Extreme rigidity, careful guiding of all reciprocating parts and provision to take up wear are features of this pump. Due to the reciprocating motion and the high speed at which pumps for hydraulic wheel presses operate, they are subject to more deterioration on account of wear than other parts of the machine. In the design of this new pump particular attention has been given to overcoming these difficulties.

The cylinder block for the three-plunger, high- and low-pressure type of pump, is mounted on a casting which acts as a cover to the self-contained reservoir. This cover is provided with machined pads for the forged-steel cylinder block and the cast crosshead guide. The cylinder block is a one-piece steel forging with plunger and valve cavities bored out. Bronze seats are provided for the valves. The one-piece cast crosshead guide is provided with babbitted bearings. The crossheads are of large diameter so as to reduce the bearing pressures resulting from side thrust. Grease-cup lubrication and wedge-type brass adjustable take-ups are provided in the crossheads.

The Class "SS" pump is furnished in either two- or three-plunger types. With two plungers both are of the high-pressure type, while with the three-plunger construction, one low- and two high-pressure plungers are provided. Automatic knock-out or pump unloading valves of the spring-loaded type are connected to the pressure chamber. The springs are set to balance at a predetermined hydrostatic pressure. When this is exceeded the springs compress and cause a system of levers to raise the suction checks from their seats, thus rendering the particular cylinder which they serve inoperative. This is accomplished automatically and permits the low-pressure part of the stroke to be accomplished at high speed with all the plungers of the pump operating. As the work in the press increases the pressure builds up the knock-out valve on the low-pressure cylinder and holds the



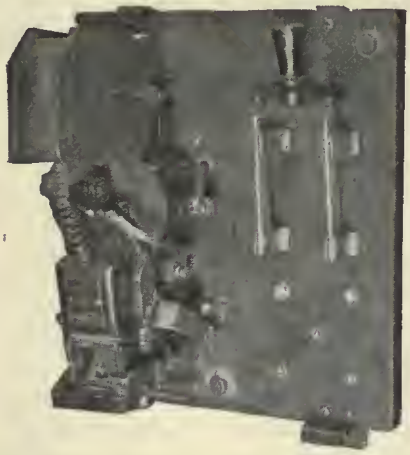
Three-Plunger High and Low Pressure Type of Pump for Hydraulic Wheel Presses check from its seat, rendering the cylinder inoperative during the balance of the high-pressure stroke. The high-pressure cylinders are also provided with knock-out valves which are adjustable and can be set to release at a predetermined pressure.

In addition to operating automatically the knock-out valves are provided with hand levers and they may be thrown out at the will of the operator. The hand levers do not effect the automatic operation of the knock-out valves. The Class "SS" pump is provided in four sizes, from 7½ hp. to 15 hp.

New D.C. Control Relay

A MODIFICATION of the control relay known as the type S has been developed by the Westinghouse Electric & Manufacturing Company. Control relays are generally required for the closing-coil circuits of electrically operated air and oil circuit-breakers. The type S relay adds a trip free feature to the circuit-breaker control system, thus preventing the breaker from being held closed by the operator in case of a short circuit.

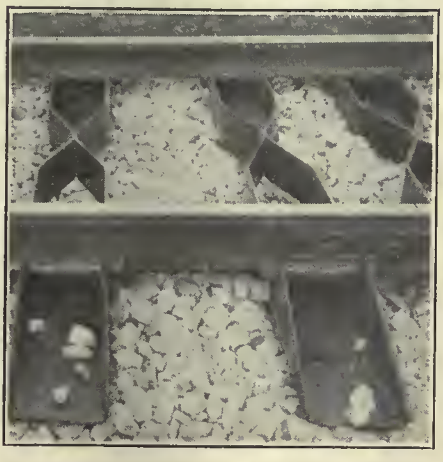
The type S control relay is provided with a two-piece contact arm and a release coil. As soon as the circuit-breaker is closed by the operator, the pallet switch on the breaker energizes the release coil of the control relay. The release coil opens the contacts of the control relay, irrespective of the fact that the operator may hold the control switch in the "closed" position and thus still be energizing the main coil of the control relay. This arrangement requires that the operator return the control switch to the "off" position before he can again close the circuit-breaker.



Control Relay with Knife Panel Switch

All-Metal Railway Tie

AN ALL-METAL railway cross-tie with several new features is being placed on the market by the Metal Safety Railway Tie Company, Philadelphia, Pa. This tie is of a channel type made to standard dimensions. Its construction permits of considerable flexibility, but is such that heavy tonnage thrusts and wheel shocks are received and absorbed.



Section of Track with Metal Railway Ties

Pockets are provided in the upright side of the tie to act as seats for the rail, which are held in position by wedges. Two semi-sleeve type wedges are used, one on either side of the rail at each pocket. When inserted they are driven home with a heavy maul. The rails are thus anchored to each tie and the wedges resist longitudinal and lateral thrusts. This method prevents widening of the gage and retains the rails firmly in a perpendicular position.

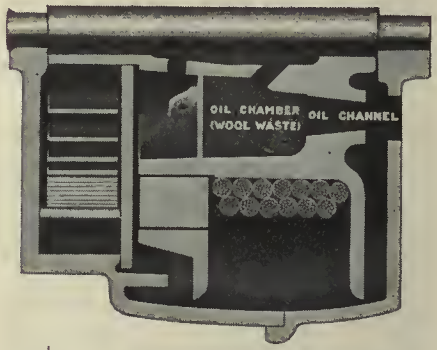
The metal safety ties can be applied to any size or section of rail and do not necessitate any departure from the rail or joint punching in use. At points where it is necessary to insulate the tracks for signal circuits this can be taken care of by using a fiber lining in the wedges.

A Self-Lubricating Trolley Catcher

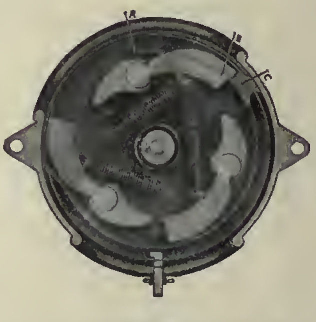
DUE to its location on the dasher of a car, the trolley catcher is subjected to the most severe weather conditions. The construction must be more or less open in order that it may function properly, and this exposes the parts to the influence of snow, rain and dust. Adequate lubrication is therefore of great importance.

The Ohio Brass Company has recently improved the O.B. catcher by providing means for oiling all parts with one application of oil through a single opening. This is done without removing or deranging any parts of the catcher or taking it off the dasher of the car. In the center of the new device there is a chamber packed with wool waste with outlets leading to the center stud and the throw-out dogs. It is necessary only to engage the reel latch with the reel and insert any ordinary oil through the opening in the cover thoroughly to saturate the wool waste. The rotation of the reel in its regular operation will then produce lubrication at every point where it is needed.

Another feature of this catcher is the positive protection against stepping-up. When the trolley wheel leaves the wire and the catcher is tripped, one of the dogs will slide over the guide, indicated by letters *A-B* in the accompanying illustration, and engage with stop *C*, preventing any further upward flight of the pole. Rebound of the pole cannot cause any stepping-up as it is necessary for the dog to back from *B* to *A* before it is released from the guide to assume its normal position. The guide is of sufficient length to permit taking in more of the rope than that which is released by the rebound effect.

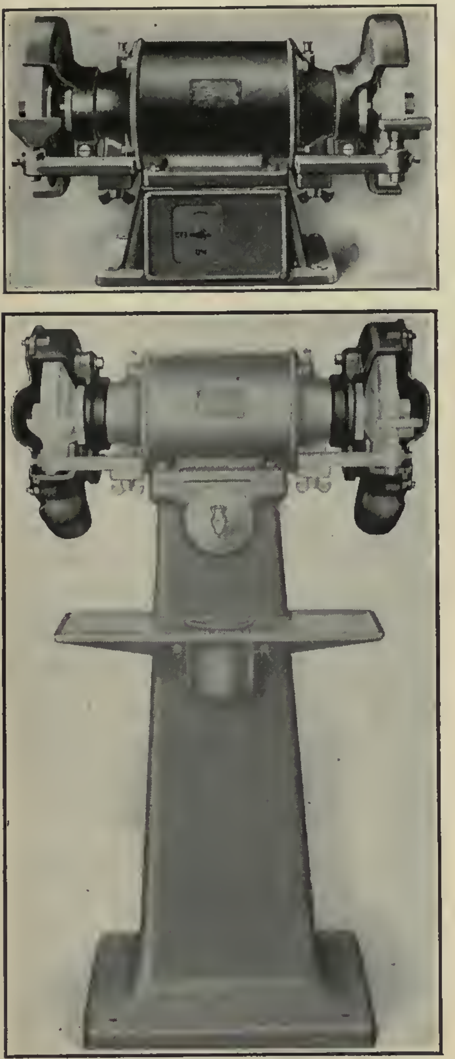


In the Center of the Reel of This Trolley Catcher Is a Chamber Containing Oil-Saturated Waste



The Dog Does Not Release Until the Reel Is Turned Backward Nearly a Quarter Revolution

The new Brooklyn cars described in this issue are equipped with these catchers.



New Type Grinders—Above, Bench Grinder. Below, Floor Type

Improvements in Floor and Bench Grinders

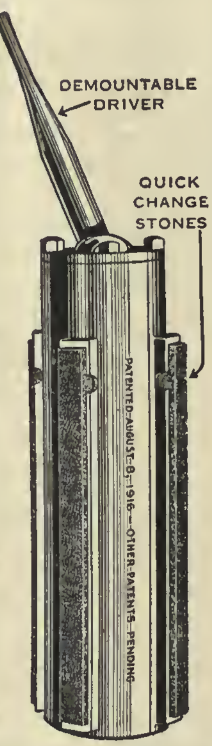
SEVERAL new features have been introduced into the design of floor and bench grinders being marketed by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The control of the operating motor is by a button located on a plate in front of the machine with the switch proper completely inclosed in the base. This mounting insures protection for the parts and gives ready access to the switch mechanism by removing the cover plate.

The end heads for the operating motor are cone shaped, which gives the maximum working space around the grinding wheels. Combination wheel guards are provided with removable end covers and exhaust pipe connections. They are adjustable to any angle and to provide for wheel wear. They are designed so that the wheels can be removed independently. The spacing between the two grinding wheels is made particularly large, so that two operators can work without interference.

Ball bearings are used throughout, and are mounted in motor end caps in close proximity to the grinding wheels. The bearings are completely inclosed from dust and dirt and provided with heavy felt washers on each side of the bearing housing.

Tool for Resizing Compressor Cylinders

THE National Brake Company, Buffalo, N. Y., is marketing a device for resizing compressor cylinders, which is called the Auto-Hone. This consists of a center arbor with honing stones mounted on its circumference. The position of the stones is adjustable, so they may be made to fit cylinders between 3½-in. and 4½-in. bores. Pressure on the stones is regulated from the driving end of the tool. To grind the cylinder the tool is slipped in and is then connected to an ordinary electric drill by a demountable driver. As the Auto-Hone revolves, the stones grind the walls to cylindrical shape. Two sets of stones are furnished, one for quick cutting and the other for fine honing. The stones are 8 in. long and bridge the area of wear so as to grind the full length of the cylinder. One set of stones will grind about 100 cylinders.



Device for Grinding Compressor Cylinders

New Railway Lightning Arrester

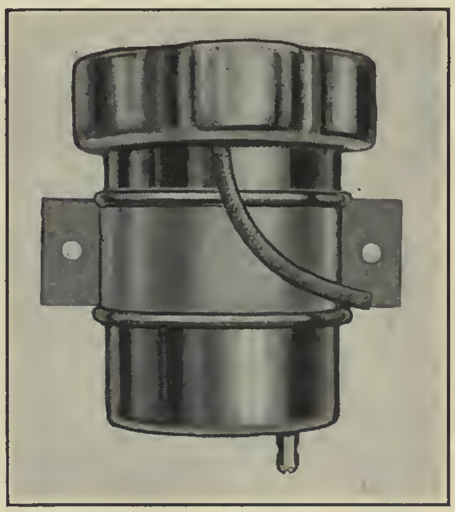
THE Electric Service Supplies Company has placed on the market a new type of direct-current railway lightning arrester, intended for both car and line service, and known as their type IC. These arresters have been designed to fill the demand for a highly efficient railway lightning arrester completely incased in porcelain.

Type IC arresters are entirely self-contained; that is, they do not require an external protecting box, and are so constructed as not to require or permit inspection. The maintenance of the arresters is practically limited to the replacing of damaged units. From experience gained through the use of porcelain-incased arresters on power and lighting circuits of some of the larger central stations, indications are that the total annual maintenance costs may be kept well below 1 per cent of the original cost of installation.

The new arresters permit of easy and cheap installation and are small enough to be installed on the most crowded pole or in any convenient location in a car.

These new arresters consist of a porcelain body, entirely sealed, which houses the operating mechanism. The arrester is of the spark-gap type, and for interrupting the flow of power current following the lightning discharge to ground, use is made of the long standard Garton-Daniels circuit breaker principle in a modified form. In this new arrester a permanent discharge path is provided from line to ground. The circuit breaker path is normally open and forms a shunt to a portion of the discharge path. The power current following a discharge to ground closes this circuit breaker path, transfers the dynamic current flow from the discharge path to the circuit breaker path, de-energizes the solenoid-operating coil and permits the circuit breaker to cut off the flow of power current to ground.

Due to this particular construction it has been possible to secure a very compact unit and one whose efficiency is high. The same arrester is used for both car and line service, different hangers only being provided for the two conditions. The arrester being entirely self-contained enables one to tell at a glance whether it is in good condition or not.



Spark-Gap Self-Contained Type of Lightning Arrester

American Association News

Exhibits Finest and Largest Ever Displayed

Many New Devices Were Shown—Something of Interest for Each Department of the Electric Railway—Space Devoted to Buses Was 24 per Cent of the Total

THE display by manufacturers at the forty-second annual convention of the American Electric Railway Association surpassed all previous records. A total of 167 exhibitors had displays, which occupied 75,930 sq.ft. of space. Of this amount 374 sq.ft. was outside the pier in various track exhibits.

A particularly noteworthy feature of the display was the large amount of space devoted to bus exhibits and accessories, which consumed 24 per cent of the space. At last year's convention in Chicago, out of a total of 62,000 sq.ft., 11 per cent was taken by bus exhibits. This year's record for space taken by bus companies is thus three times that of the Chicago displays.

There have been very interesting exhibits at the association conventions in the past, but none, in the opinion of those in attendance, where more new developments were shown. There was something instructive for each department of the electric railway.

AUTOMATIC SUBSTATION AND REMOTE CONTROL DEVELOPMENTS

Power men found much of interest in the developments shown in apparatus for automatic substation and remote feeder control. New apparatus showed the adaptation for this service of electro-pneumatic contactors of standard types used in electric railway service for starting and running synchronous converters. Small synchronous converters with high-reluctance interpoles can be started successfully without raising the brushes from the commutator and the automatic control for such machines is simplified thereby. Other interesting developments included a pneumatic mechanism for closing oil-circuit breakers, supervisory control for switching equipment of all kinds at remote points and remote load indicating devices for transmitting meter indications over two-wire telephone circuits or their equivalent.

Way and track men found much of interest in a large variety of trackwork, tie and welding exhibits. The association's exhibit showing samples of various welded rail joints tested to destruction, together with photographs showing the methods used in making the test joints, received considerable attention. New designs for frogs and switches showed the attention that is being given toward developing trackwork that will give longer life with less trouble in service. There were a large number of exhibits of metal and substitute ties for both open and closed tracks. The new types showed that much attention is being given toward producing a satisfactory substitute tie. Welding displays were more elaborate than ever before and several new track grinders were shown.

The increased use of cars operated by one man has resulted in improvements in overhead construction to prevent trolley wheels from leaving the wire. Several new designs of overhead frogs were shown. A universal frog with overlapping runners has been brought out which prevents the flanges of trolley wheels from running on the pan.

Improvements in fare collection and registering devices have also been influenced by one-man operation of cars. New designs show a trend toward instantaneous registration, more rapid operation, reduction in weight and simplification of mechanism to relieve operator of duties.

Equipment for controlling and operating doors and steps also showed considerable advancement. Operation has been simplified to reduce trouble and save time. Special consideration has been given to preventing accidents. Thus in one new design shown the failure of the air supply or an open circuit in the electrical circuit closes the door automatically.

Other parts of car equipment showed interesting improvements. A new light-weight control equipment was shown for the first time and a fan ventilation attachment for application to old motors was said to make it possible to increase their capacity 36 per cent.

There were many developments in electric heaters and thermostatic control equipment. New heating elements imbedded in insulating material permit of many new designs of heaters such as the floor type, which was exhibited. The use of high-grade resistance wire is quite general and permits new types of construction of other parts.

EQUIPMENT FOR THE ACCOUNTANTS SHOWN FOR FIRST TIME

The accounting and auditing departments of the railways, found much to interest them this year in the large number of exhibits containing new coin counting and wrapping machines, also improved calculating and listing machines.

Exhibits outside the pier included an electric trolley bus and two electric locomotives. The trolley bus was one of those purchased for use on Staten Island, N. Y. One of the electric locomotives was for service on the Glendale & Montrose Railway. This locomotive weighed 99,000 lb., had a total wheelbase of 22 ft. 6 in. and was provided with 36-in. diameter wheels and 5 x 9-in. journals.

STATISTICS ON BUS EXHIBITS

There was a total of twenty-six gasoline-driven motor buses and one electric trolley bus shown. Of the twenty-six gasoline-driven buses, seventeen were of the street car type, six were of the sedan or limousine type, three were double deckers and one was of observation type. The street car types seat from sixteen to twenty-nine passengers on a single deck, while the intercity coaches accommodate from seventeen to twenty-four passengers. The double deckers carry from fifty-one to sixty-seven. Five of the limousines had smoking compartments that accommodate from six to eight persons.

For the most part, the street car types were finished with leather seats, only six having rattan, which is the popular choice on the three double deckers shown. Seven of the buses and chassis on exhibition had air brakes, in one case on all four wheels. Pneumatic tires in sizes ranging from 32 x 6 to 36 x 6 seem to be most favored with dual rears. The doughnut type of tire with 20-in. wheels was found in one exhibit.

Prices f.o.b. factory for the city type buses exhibited ranged from $2,400 to $8,000. For the long-distance intercity buses with smoking compartments the cost is higher, in fact the range is from $7,000 to $10,000. The double-deck buses exhibited cost approximately $9,000.

Special Reports Available

The Bureau of Information and Service of the American Electric Railway Association states that the following special reports have been prepared and are available to member companies in good standing upon request:

Wage Bulletin No. 128—For each of nearly 400 companies there is shown the rate of wages in effect Oct. 1, 1923, the date the rate became effective, the date of expiration, the average weekly wage earned under this rate, bonuses paid, previous rate of wages and the effective date, the union status of the trainmen and the wages of bus operators where the company operates buses.

Effect of Fare Changes on Revenues and Riding Habit—A group of companies having two or more fare changes has been selected and for each company there is shown the cash fare, ticket rate and transfer charge, if any, and a month by month statement of the number of cash passengers and ticket passengers, and the passenger revenue divided between revenue from cash fares and revenues from ticket sales.

The Weekly Pass—Gives a list of companies using the weekly pass with the effective date and the rate at which the pass is sold, together with figures showing the number of passes sold per year, the average number of rides on each pass, the average fare per passenger before and after the pass was introduced, the methods of introducing the pass and statement of the company's views as to the advantages and disadvantages of the pass.

The Indeterminate Permit—Contains copies of state laws providing for indeterminate permit, indorsements of it by public bodies and numerous public statements and arguments in favor of the general use of this type of franchise.

In addition to the above supplements to the Fare Bulletin and Cost of Living Studies have been prepared bringing this information down to date.

The News of the Industry

Thompson Policy Reversed

Chicago Is $8,189,128 Richer Under the Policy of Conciliation of New City Administration

The City Council of Chicago on Oct. 17 voted unanimously to repeal the 1921 ordinance forfeiting the franchise of the Chicago Surface Lines. At the same time it approved the abandonment of pending forfeiture suits, voted to accept the city's share of the companies' profits, aggregating more than $8,000,000, and paved the way for immediate service improvements even while negotiations are under way to bring about municipal ownership of the traction system.

All these things were done on the recommendation of Mayor Dever. In other words, the City Council has reversed the attitude toward the company taken during the administration of former Mayor Thompson, who kept the traction question an issue in political campaigns.

After rising operating costs had made it necessary for the state regulatory commission to increase the fare in Chicago above 5 cents, Thompson insisted that the Chicago Surface Lines had broken its contract with the city, and the City Council, at his request, passed a measure forfeiting the 1907 franchise ordinance, under which the companies operate. The city law department also filed forfeiture suits against the traction lines and the city administration refused to accept the city's 55 per cent of the companies' net receipts since 1920, on the theory that it would prejudice the settlement of the forfeiture suits.

The city's share of the companies' profits which have been offered each year, but not accepted, now aggregate $8,189,128. If this amount had been accepted the city's traction fund would now total more than $36,627,000. By the Thompson administration's refusal to accept this money it is estimated the city lost $650,000 in interest.

Mayor Dever, in his message to the City Council, which resulted in tossing the policies of the former administration overboard, called attention to the fact that negotiations had been opened between the city authorities and officials of the Chicago Surface Lines looking to the purchase of the system by the city. He added that officials of the elevated lines are out of the city, but that conferences will be held with them in the near future, for the same purpose.

Mayor Dever said:

> I respectfully request that you pass at once the ordinance recommended by the local transportation committee, repealing the so-called forfeiture ordinance of Feb. 4, 1921, and directing the corporation counsel and the special traction counsels, which I transmit herewith.
>
> I concur in their conclusions that the results of the suit and ordinances have been detrimental to the best interests of the city and beneficial only to the surface line companies.
>
> The policy pursued resulted in the city's refusing to accept since 1920 the city's 55 per cent of the divisible net receipts of the Surface Lines, amounting now to $8,189,128.
>
> The institution and pendency of this suit have for the last four years obscured vital phases of the local transportation problem.
>
> Based as it was on an erroneous theory, it has held false hopes impossible of realization, and at the same time has paralyzed all constructive efforts by the city to compel the companies to live up to their obligations under the ordinance.
>
> Each time it was proposed by the City Council to take affirmative steps to procure performance by the company of its ordinance obligations to give better service or construct further tracks it was met with the objection that such action must not be taken because it would be inconsistent with and interfere with the prosecution of the forfeiture suit. In this way the companies got all the advantages of their franchises, because action by the city was suspended; they were relieved of their obligations under the ordinances.
>
> With the forfeiture suit and ordinance out of the way, the city again will be in position to demand and enforce a complete compliance with those provisions of the ordinances, which under the decisions of our Supreme Court are binding upon the companies and enforceable by the city.
>
> If then the companies fail to comply with those terms of the ordinance and thereby commit substantial breaches of their obligations, the city will be able to declare a real forfeiture and to institute proper suits to bring about a cancellation of the companies' rights.

The Mayor's legal advisers also recommended that the city appoint its representatives on the two boards of supervising engineers, who oversee the operation of the traction lines.

How the New Award Works Out in Boston

As was announced in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 20, a wage increase of 9 cents an hour was recently awarded the 7,500 employees of the Boston Elevated Railway. How the award actually works out in cents per hour for surface line men and rapid transit employees is shown in the accompanying table.

Surface lines, motormen and conductors:

First three months of service	.57
Next nine months of service	.63
Thereafter	.70

Rapid transit lines, motormen:

First year of service	.71
Thereafter	.72

Rapid transit lines guards:

First three months of service	.57
Next nine months of service	.63
Thereafter	.70

One-man car operators and bus drivers—8 cents per hour in addition to regular rate.

Snow work—Time held or worked.

Conductors, motormen or guards, 20 cents per hour in addition to regular rates.

Conductors, motormen, guards, gatemen, collectors, train clerks when instructing learners, 12½ cents per hour in addition to regular rate.

Settlement Plan Suggested

Ten-Cent Fare and Relief from Paving Burden Are Being Sought by Davenport Road

A comprehensive plan for rehabilitating the railway system of Davenport as a successful and continuing business has been proposed to the City Council by B. J. Denman, president of the Tri-city Railway of Iowa.

A 10-cent fare, a new car rerouting system, permission to operate single-truck cars on some lines, abandonment of some trackage, a lower revaluation of traction line property, backing by the city of a bill in the Legislature to give special chartered cities power to fix paving assessments on railway lines are the main points in this plan.

The increased fare would result in an increase in revenue of $109,299 annually, Mr. Denman estimates. The elimination of trackage would reduce operating expenses $50,000. The nub of the whole matter, however, is the burden of paving cost, now assessed against the company by state law. Under this law the company is compelled to pay the entire cost of paving between its rails and 1 ft. on either side. It is proposed to introduce a bill in the Iowa Legislature allowing special chartered cities, among them Davenport, to meet the cost of paving as they shall see fit. If this bill passes it will be understood that the Davenport City Council makes an equitable adjustment with the traction lines on paving. The suggestion has been made that the company pay for the foundation under its tracks and the city meet the cost of surface paving entirely, either by tax on abutting property or partly from a general fund.

The rerouting system asked was turned down by the City Council some time ago. It provides for the elimination of approximately 5 miles of track, a large increase in service, building of passing tracks, a generally faster schedule and an expense of approximately $400,000 to the company.

It is also proposed that the assessed valuation of $2,000,000 be reduced and the value of the property be more nearly based in its ability to earn. The Council has not the authority to make this reduction, but it could assist when the proper time comes, Mr. Denman states.

The Council received the communication and a special committee consisting of the standing committee on transportation, the Alderman-at-large, the Mayor and the city attorney was appointed to handle the problem.

The company, through Mr. Denman,

had stated some weeks ago that unless financial relief were granted operation of the railway would cease. Prominent business men, Councilmen, the daily press and labor organizations clearly indicated that street cars are wanted and that concessions must be made to keep the system in operation.

The daily press, in commenting on this latest plan of the company, suggests that it is the basis of a constructive solution of the railway problem and that the traction lines and the Council should be able to come to an understanding that will remove the existing drawbacks to successful operation and provide for operation, adequate to the city and profitable for the company. The press, however, suggests a lower fare than 10 cents for habitual riders. The present fare is 8 cents.

Mr. Denman's letter to the Council contains an estimate of operation under the conditions outlined in his request. He says that it should not be overlooked that the riding is continually decreasing, due to the increasing use of the automobile. The expressed belief of the company is that its traffic will decrease 10 per cent with a 10-cent fare, due in slight measure to the increase in fare, but in greater measure to the increasing use of the automobile. Assuming, however, that there is a decrease of 7 per cent in the traffic, it is estimated a 10-cent fare would produce an increase in revenue of $109,299. This is arrived at by applying the proposed fare to the number of passengers in each class carried, and the increase in revenue arrived at as indicated in detail in one of the exhibits attached to the application.

Mr. Denman says that it will be some time before the operating economies mentioned in the application can be effected, and until that time the new fare would give the following results:

Annual revenue as shown in Exhibit D	$856,176
Less operating expenses, taxes and depreciation	706,307
Net return on investment	149,868

According to Mr. Denman, this gives a return on the valuation of Burns & McDonnell of 1920 (not including construction since that date) of 4.61 per cent. It should not be overlooked that operating expenses for the past twelve months include an increased wage to train and shop men since June 1. He says that had the new wage been in effect the previous nine months, expenses would have been increased and the net revenue decreased by that amount. When the operating economies previously mentioned are in force, it is estimated that a saving of $50,000 per annum will be effected, thus making the total net earnings available for return $199,868, or 6.14 per cent on the valuation of Burns & McDonnell.

During the past six years the company scarcely made operating expenses, and it was impossible to maintain the property adequately. It is explained that this relates particularly to the overhead work and that it is necessary to spend at least $50,000 to put the poles and trolley wires in proper condition. This will be an additional item in operating expenses, not taken into account in the discussion. Mr. Denman says that a great deal of this work will have to be done within the next twelve months and practically all of it within the next eighteen months. He assures the Mayor and the members of the Council of the sincere desire of the company to be of every possible assistance to enable them to check the correctness of the figures presented by the company.

Injunction and Damages Sought by Maumee Valley

Precedent may be established in Ohio when the Common Pleas Court at Toledo makes a decision on the petition of the Maumee Valley Railroad seeking to enjoin the Ohio-Michigan Coach Line from operating a parallel bus service without a certificate of convenience and necessity from the State Public Utilities Commission. The plaintiff claims the operation of the bus line is "unlawful competition" because other provisions of the new state bus regulatory law have not been complied with by the bus company.

The railroad recently spent $500,000 in providing new cars and equipment and speeding up service for the communities served.

In addition to the injunction the railroad seeks an award for damages it has suffered while the buses have been operating.

The court has taken the matter under advisement following a recent hearing on the petition.

Wage Settlement Reached in Springfield, Ohio

An increase of 3 cents an hour was granted platform men of the Springfield Railway, Springfield, Ohio, under the terms of a new scale after negotiations extending over a period of six weeks. The new scale, retroactive to Oct. 1, provides for 45 cents for the first three months, 47 cents for the next nine months and 49 cents thereafter.

The new scale represents a compromise offer by the company, the second to be made by it during the negotiations. The first compromise proposed a scale of 44, 46 and 48 cents. The carmen had demanded 46, 48 and 50 cents. The former scale was 42, 44 and 46 cents.

The company threw its books open for inspection by a committee from the union and made a second compromise offer, which was accepted. Some slight changes were made in the working conditions, one of these being the agreement by the company to supply tickets to the conductors and to collect for them at the end of the day. Heretofore, the conductors have been required to pay cash in advance for tickets. The conductors will still carry their own change. The scale continues the nine and one-half hour day basis on a seven-day week.

No Inequality to Seattle-Rainier Charge

The State Department of Public Works has found that since the Seattle 8⅓-cent carfare there is no inequality to the same charge by the Rainier Valley line. Walter B. Beals, assistant corporation counsel, who represented the city of Seattle at the hearing, said that although the complaint had been dismissed, most of the petitioners' grievances had been righted by the company on its own initiative since the hearing before the department handed down its ruling. He cited the granting of school fares for children at ten tokens for 25 cents, the same rate charged by the Seattle Municipal Railway; abolition of the transfer charge, under which patrons formerly paid 10 cents if they wished a transfer to the Municipal Railway, and the company's concession by which patrons can buy three tokens for 25 cents instead of buying 50 cents worth at one time. The department, tentatively accepting the company's valuation and operating costs, found that it was getting a return of 4.72 per cent, after the president's salary had been listed at $3,000. It commented on the non-resident president, pointing out that he lived in the East and acted as financial agent for the company, as well as for several other firms, and spent only two or three weeks in Seattle every year.

Service Restored in Milan

The Milan, Ill., tangle, involving a proposed new franchise for the operation of cars of the Tri-City Railway and the extension of the company's service, curtailed early in the summer by the hard road construction work, was adjusted at a conference between T. C. Roderick, general manager of the railway, and a special committee from the Milan town board, headed by Mayor B. H. Rollis. Under the agreement reached the railway will be completed in a short time and service restored to the Milan residents. The new route will cut off three blocks of the old car line routing. The franchise of the Tri-City Railway to operate cars in that village expired on Aug. 28 and up until the settlement the company had not indicated that it wished to resume service through the city.

Railway Troubles Discussed.—A public meeting was held recently in Anderson, S. C., at which the entire railway situation was gone into in an effort to devise some means to lighten the burden on the Southern Public Utilities Company. Efforts are being made to avert, if possible, the threatened suspension of service. It was brought out that revenue from street car service is not now sufficient to pay for operation, to say nothing of interest on bonds, taxes, depreciation, etc. No definite plan to aid the company to keep the system in operation was decided upon, but it was intimated that Council might relieve it of a part of its tax burdens and of its street paving assessments.

No Agreement in Cincinnati Over Replacement Expenses

At a recent meeting of the directors of the Cincinnati Street Railway no agreement was reached in the controversy between the company and the Cincinnati Traction Company over $4,000,000 of repairs and replacements to the street railway system. Several members insisted that the arbitration procedure be abandoned and that the controversy be taken into the courts for immediate settlement. Another group contended that if the differences between the two companies could be settled by arbitration that was the proper course to take. It was said that any settlement made would be with a view of eventually returning the traction properties to the Cincinnati Street Railway, which leased it to the traction company in 1896 for a period of fifty years. It is understood that the lessor company would eagerly take back the system, but not in its present condition.

The directors of the Cincinnati Street Railway have intimated that the necessary repairs and replacements as outlined in the report of Stone & Webster, engineers, who made a survey of the traction properties, would have to be made or the amount necessary to make these improvements deducted from the selling price before it would consider any proposition. The Cincinnati Traction Company, on the other hand, is willing to surrrender its lease, but under no circumstances will it sell at a sacrifice price. The Cincinnati Traction contends that it has expended approximately $13,000,000 in repairs and betterments to the traction system since it took it over and that this amount must be taken into consideration. On the other hand, the Cincinnati Street Railway charges the lessee is in default of the covenants of the lease to the extent of $4,000,000.

Magazine Articles Helpful to Railway Men

Forbes for Oct. 13 might almost be called an electric railway issue. In it are told "How the North Shore Line Set Out for a Goal and Made It," by Neil M. Clark; "How Paul Shoup Made His Mark," by B. C. Forbes, and the story of "A Merit and Bonus System that Rewards and Fires," by Charles Alma Byers. On the cover is a full-length half tone of Britton I. Budd, the president of the North Shore. All of the articles are illustrated, the pictures including portraits of Mr. Shoup and of George Baker Anderson, originator of the merit and bonus system of the Los Angeles Railway and manager of transportation of that company. To readers of the ELECTRIC RAILWAY JOURNAL the personal accomplishments of these men and their achievements for the companies with which they are connected are pretty well known; but all of the stories, written by men trained in the school of popular magazine work, are most helpful to the railway man, in that the authors have unconsciously reflected in their stories the viewpoint of the general public about railway matters.

Will Extend Chicago "L"

Plans have been formulated for an extension to the Northwestern branch of the Chicago "L" system at Howard Street and a company has been organized to prepare the right-of-way. This new organization, to be known as the Chicago, North Shore & Northern Railroad, after construction is completed, will enter into an agreement with the Chicago Elevated whereby it will be possible for the Elevated to operate its cars over this new company's right-of-way. The proposed trackage will start at Howard Street, or the city limits, form whence it will proceed dircetly west 3 miles to Cicero Avenue, and then turn north and proceed 2¼ miles to Dempster Street, Evanston. Stations at appropriate locations will be constructed along the line, while terminal facilities and yards will be provided at the Evanston-Dempster Street end. The construction will include submerged right-of-way and elevated structure wherever necessary.

Future plans call for a connection between the Dempster Street terminal and the Chicago, North Shore & Milwaukee Railroad's right-of-way at North Chicago. Such construction would make possible the operation of the present North Shore's Chicago to Milwaukee electric trains over a private right-of-way which skirts the numerous municipalities located between Chicago and North Chicago. This would cut down considerably the running time for the North Shore "De Luxe" through trains.

Special Permit Granted.—The Rockford & Interurban Railway, Rockford, Ill., has been granted a special permit to operate cars for a period of ninety days after Oct. 3, when the franchise expired. Negotiations for a new franchise are now under way.

Signs Taraval Line Bill.—Following a conference with President T. A. Reardon of the Board of Works, Mayor Rolph of San Francisco has ordered through service on the San Francisco Municipal Railway from the Parkside to the ferries. The service is to be put into effect right away. The Mayor said that the development of the district served by the Taraval line would increase the assessment of San Francisco and for that reason he believed the best interests of the city were served by this extension of service.

Engineer Reports on Washington-Baltimore Road.—A report on the financial operation of the Washington, Baltimore & Annapolis Electric Railroad and the Annapolis & Chesapeake Bay Power Company, covering the years 1911 to 1922, has just been issued by J. A. W. Inglehart & Company, Baltimore. This report, which was prepared by W. T. Ballard, states that the physical properties were found to be in good condition, and while it is not possible that they will ever have a spectacular growth, their progress promises to be constant. The earnings of both companies have been fully sufficient over a period of years to protect interest requirements on the bonded indebtedness.

May Nullify Franchise.—At a recent meeting of the City Council of Milwaukee the company was charged with violating its promises by permitting the freight and baggage interurban cars to be operated over the streets in West Allis. The Council approved taking measures to nullify the present franchise, granted the company several years ago. The controversy, it is said, is an outgrowth of the track removal question which has been a matter of discussion for some time. The plan of the city is to have the company move the tracks on Burnham Street from the north side to the center of the road at the company's expense. The failure of the company to make this removal may result in the halting of service.

People to Decide Trolley Fate.—At a recent meeting of the committee of the whole of the Board of Estimate of New York, Borough President Connolly, discussing the operation of the New York & North Shore Railway, said that the residents of Flushing, Whitestone, Bayside, Douglaston and Little Neck, Long Island, would be questioned soon on their desires with respect to the operation of the line. He said that the matter would be determined definitely by a questionnaire which would be sent out by the borough. At the meeting at which the city operation of the line was considered Grover Whalen, Commissioner of Plant and Structures, gave his opinion as to the trolley line, as compared with the bus line, saying that a modern bus line owned and operated by the city would be preferable.

Safety Behind Refusal to Operate—General Manager Clinton E. Morgan, in emphatically refusing to continue bridge operations when the city starts the municipal lines on the Williamsburg Bridge, contends that safety of operation is the motive behind his refusal. He points out that while the bridge is not used now to the point of saturation, another line, of the type Mr. Whalen proposes, would crowd the private cars off. He said his company wants to give all the service possible and to make the service satisfactory, but it wants to continue to be a safe service. The franchises of the Brooklyn City Railroad and the Brooklyn-Manhattan Transit Corporation do not require bridge operation, and since the city owns the bridge the commission cannot stop it from running cars on it. The city has had tied up in equipment for three years the sum of $600,000. In addition there has been a loss to the city of 5 per cent interest for three years on this sum, making the total amount of money lying idle for three years $690,000.

Financial and Corporate

Paris Expenses Exceed Receipts

With Its Subsidy, the Company Earns Profits and Pays 8½ per Cent on Its Capital Stock

All of the public transportation in Paris is conducted by the Société des Transports en Common de la Region Parisienne, which operates not only all of the tramways and buses, but one short suburban steam line and passenger boats on the Seine. On Dec. 31, 1922, the company operated on its electric tramways 1,818 electric motor cars and 861 trail cars; on its steam lines, nineteen locomotives, thirty-four passenger cars, ten baggage cars and 122 freight cars; on its bus lines 1,115 motor buses, and on its boat system, fifty-six motor passenger boats, two tugs and sixty-eight towboats. The annual report of the company for 1922, submitted June 26, 1923, indicated that on Jan. 1, 1923, the company had under course of construction to supplement this equipment sixty-seven electric motor cars of standard design and 250 light-weight motor cars, eighty-eight motor buses with four wheels and fifty motor buses with six wheels each, eight additional passenger boats and fifteen towboats.

Receipts from operation during 1922 amounted to nearly $21,000,000. Of this sum the electric cars brought in nearly 63 per cent and the motor buses nearly 35 per cent, leaving about 1 per cent for the steam railroad and boats combined and 1 per cent for miscellaneous operating revenue. During 1922 there was an increase of 5.1 per cent in passengers carried and of 10.8 per cent in operating revenue, as compared with 1921.

As has been described in previous issues, the company has a contract with the Department of the Seine, in which Paris is located, by which it operates these various means of transport under the direction of the department authorities. For this service it receives compensation, whether or not the operation of the system as a whole is profitable, and this compensation includes two premiums, known as the managing premium and the economy premium, varying in amount with the financial results obtained. As a net result the company earned a profit for the year, although the operating expenses exceeded the gross receipts. The accompanying tables are for the year ended Dec. 31, 1922.

There have been two increases in fare since Feb. 18, 1919. One was on April 1, 1920, the other on Jan. 19, 1922. Fares are on the zone basis, and the present tramway fares, expressed in centimes, are given in the accompanying table. One hundred centimes make a franc, and the rate of exchange for a franc has been assumed in this article as 7 cents. In the table of operating statistics below, the figures have been changed to miles and dollars. The other tables give francs.

PARIS TRAMWAY FARES IN CENTIMES

	First Class	Second Class
For the first zone	35 to 40	25
For two zones	55	40
For each succeeding zone after two	15	10

PROFIT AND LOSS ACCOUNT

Receipts of company (based on Article 23 of the franchise).	
Interest at 6 per cent on the capital stock of Fr. 60,000,000	Fr. 3,600,000.00
Premium earned by managing bonus	2,425,158.09
Premium earned by economy bonus	3,166,177.39
	Fr. 9,191,335.48
The expenses chargeable to the company are fixed, according to Article 23 of the franchise.	
Salaries, premiums, etc., to the operating management, remuneration to the directors and auditors, etc., amount to	Fr. 2,923,723.67
Second annual payment to amortize the guarantee fund	300,000.00
Total expenses	Fr. 3,223,723.67
Credit balance	5,967,611.81
	Fr. 9,191,335.48

OPERATING STATISTICS, PARIS TRAMWAY, OMNIBUS AND BOAT SYSTEM, FOR 1922

	Vehicle-Miles or Boat-Miles	Passengers	Total Receipts	Receipts in Cents per Vehicle-Mile
Tramways (Electric)	56,715,777	622,405,302	$13,348,512	23.4
(Steam)	669,707	1,780,563	74,865	1.1
Total for tramways	57,385,485	624,185,865	$13,348,512	23.3
Omnibuses, regular service	26,941,282	289,937,863	7,275,548	27.0
Special night service	63,794	206,579	21.557	33.8
Special theater service	1,267	1,705	179	14.0
Total for omnibuses	27,006,344	290,146,147	$7,297,284	27.0
Boats	356,283	3,391,311	143,423	40.3
Miscellaneous receipts from operation, such as excess charges, adjustments, etc	....	....	9,780	....
Total	....	....	$20,799,000	....
Receipts for freight and miscellaneous transportation	....	....	195,335	....
Grand total	84,748,112	917,723,323	$20,993,335	24.8

DISPOSITION OF CREDIT BALANCE

Credit balance		Fr. 5,967,611.81
5 per cent to legal reserve	Fr. 298,380.59	
6 per cent interest on the capital stock	3,600,000.00	3,898,380.59
Balance after these payments		Fr. 2,069,231.22
15 per cent of this balance to board of directors, according to Article 43	Fr. 310,384.68	
2 per cent extra dividend on capital stock	1,200,000.00	1,510,384.68
Balance after these payments		Fr. 558,846.54
One-half to Department of Seine (according to Article 23)		279,423.27
Balance after this payment		Fr. 279,423.27
Surplus from 1921		29,664.59
Total		Fr. 309,087.86
½ per cent extra dividend on capital stock		300,000.00
Balance carried over to next year		Fr. 9,087.86

It will be seen that each share of capital stock received an interest payment of 6 per cent and a dividend payment of 2½ per cent.

OPERATING REPORT FOR 1922

Passenger operating revenues	Fr. 297,128,574.11
Freight and other miscellaneous operating revenues	2,790,503.85
Miscellaneous revenue (exclusive of interest on investments)	3,021,418.85
Interest on sinking and other funds	641,482.52
Total revenue	Fr. 303,581,979.33
Operating expenses	304,271,425.95
Deficit from operation	Fr. 689,446.62
Amounts payable to sinking fund and special war fund guaranteed by the Department of the Seine to the eight constituent companies, etc.	Fr. 40,250,000
Charges payable by the Department on new capital	2,350,187.88
Total fixed charges payable by the Department	Fr. 42,600,187.88
Remuneration to the company under the franchise	9,191,335.48
Total of these two items	Fr. 51,791,523.36
Deficit from operation (as given above)	689,446.62
Total deficit for year	Fr. 52,480,969.98

Way Being Cleared for Kansas City Reorganization

A payment of claims aggregating $125,000 against the Metropolitan Street Railway by the Kansas City Railways has been authorized by Judge Kimbrough Stone of the Federal court. This is the first blanket order for payment of claims which has been made. It is taken to mean that the receivers have accumulated surplus funds and that a reorganization may be effected soon. The company will pay 80 per cent of the claims of certificate holders against the old Metropolitan Street Railway.

Judge Stone postponed the hearing on other priority claims against the company until Nov. 15.

In the meantime, claimants could perfect an organization among themselves.

James E. Goodrich, attorney for the company, admitted that the note and bond holders of the company had discussed reorganization at a meeting in Chicago.

The bondholders maintain their claims should be settled first, while the personal injury claimants are fighting for priority of payment. Judge Stone gave claimants who had not yet appeared in court ten days to obtain judgments or go to trial.

Birmingham Company Seeks to Defer Nov. 1 Interest

The receivers of Birmingham Railway, Light & Power Company, Birmingham, Ala., are of the opinion that their cash resources between now and July 2, 1924, will not be sufficient to discharge all of the obligations which they will be called upon to meet by that date. Among these obligations are $787,000 in principal amount of underlying bonds which mature July 2, 1924. In consequence they have filed with the court a petition in which they recommend that the interest which falls due Nov. 1, 1923, on the refunding and extension mortgage 6 per cent gold bonds be not paid. The question of whether or not the interest due on Nov. 1 shall be paid will come before the United States District Court at Birmingham on Oct. 30.

In view of the situation created by this appeal to the court the holders of the refunding and extension mortgage bonds organized with L. Carroll Root, vice-president of Newman, Saunders & Company, Inc., New Orleans, La., as chairman. This committee has arranged to pay the Nov. 1, 1923, coupon on bonds deposited with it, either by purchase of said coupons or loans secured thereby without interest. It has just announced that more than a majority of the bonds outstanding have already been deposited with the committee. If 60 per cent or more of the bonds are deposited with the committee and the principal is due by declaration or otherwise, the committee says responsible parties have contracted to buy the deposited bonds on or before May 1, 1924, at a price sufficient to yield to depositors the principal of their bonds and 6 per cent interest from May 1, 1923, to the date of payment.

As indicated previously the receivers appealed to the court because of the fear of inability to meet obligations coming due soon. The road has been in the hands of the court under the direction of Lee C. Bradley and J. S. Pevear since Jan. 23, 1919. The receivers have recently made a contract with the city which it is believed will eliminate destructive jitney competition. The ordinance went into effect on Sept. 15. It reduces the cash fare from 8 cents to 7 cents. Under the contract the receivers are required to make extensions and improvements in the service which will require very substantial expenditures. In addition the receivers have substantial amounts of receivers' certificates and bills payable, which will mature on or before July 2, 1924.

Appeals for a $40,833,292 Assessment of United Railways

The United Railways of St. Louis has appealed to the State Board of Equalization to reduce the valuation of the company's property for taxing purposes 20 per cent under the rate-making valuation fixed by the Missouri Public Service Commission at approximately $52,000,000.

If the Board of Equalization would accept the suggestion to reduce the assessment 20 per cent, it will be fixed at approximately $42,000,000 for taxing purposes this year. The company in appearing before the commission contended the valuation for rate-making purposes should be approximately $70,000,000.

The combined properties of the United Railways last year were assessed at $47,756,000, while the State Tax Commission this year recommended a combined assessment of $46,767,000, including the Missouri Electric Company.

The company paid 9.4 per cent of its total gross income last year for taxes.

Plea for Greater Participation by Owners

S. W. Huff, president of the Third Avenue Railway, New York, N. Y., has addressed a letter to the holders of the 5 per cent adjustment bonds inviting them to vote on the company's policy. Bondholders, he pointed out, are entitled to the same voting privileges as stockholders whenever the interest on the bonds has not been paid. He says that a comparatively small number of holders of these bonds are availing themselves of this voting privilege and that the directors are anxious to have as large a number of the security holders of the property as possible vote at its annual meetings, either in person or by proxy.

Minority Report Filed on New York Railways Reorganization

Frank D. Pavey has filed with Judge Mayer at New York a minority report in which he outlines a plan for the reorganization of the New York Railways which he considers much more feasible than the one filed by the majority, referred to in detail in the ELECTRIC RAILWAY JOURNAL for Oct. 20, page 718. His suggestion as to the readjustment contemplates the organization of three operating railroad companies designated as the Broadway & Seventh Avenue Railroad, New York Crosstown Railways, Manhattan Street Railway and one non-operating company designated as the New York Railways Assets Realization Company.

Mr. Pavey says the purpose of this grouping is to put the railway end of the business in a position where it can fulfill its duties to the public; where it will no longer be open to attack upon the ground that it is highly overcapitalized and operated solely in the interest of security holders; where it will be in a position to protect the relative rights of the owners of the underlying securities, and where it will be in an advantageous position for sale to the city of New York in case plans for municipal ownership are ever made effective.

Mr. Pavey feels that the plan as proposed by the majority "perpetuates the method of operation which has brought the railways of that system to ruin and to the verge of extinction." It is his opinion that the public can be served better by a series of short lines than by the new company proposed. He thinks that the organization of three operating companies will tend to protect the system in general from the adverse effects of local changes in passenger traffic. It is Mr. Pavey's opinion that the receivership ought to be continued until the affairs of the lessor companies are adjusted. He says that the New York Railways is hopelessly bankrupt, not only in respect to the payment of its private debts, but also in respect to the performance of its public duties.

Security holders of some of the companies have organized to protest against the details of the plan rather than the plan itself.

Conspectus of Indexes for Oct., 1923

Compiled for Publication in this Paper
by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	Oct. 1923 **6.95**	Sept. 1923 **6.95**	Oct. 1922 **7.00**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Sept. 1923 **163**	Aug. 1923 **165**	Sept. 1922 **181**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Oct. 1923 **218**	Sept. 1923 **215**	Oct. 1922 **208**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Sept. 30 1923 **5.04**	Aug. 31 1923 **5.41**	Sept. 30 1922 **6.69**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Sept. 1923 **13.90**	Aug. 1923 **13.90**	Sept. 1922 **13.41**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures	Sept. 1923	Aug. 1923	Sept. 1922	Jan. 1922	Sept. 1923
Number	**1,280**	**1,433**	**1,460**	**2,722**	**1,280**
Liabilities (millions)	**27.50**	**48.40**	**32.51**	**105.7**	**27.50**

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Eng. News-Record Construction costs 1913 = 100	Oct. 1923 **220.3**	Sept. 1923 **221.5**	Oct. 1922 **188.6**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Sept. 1923 **154**	Aug. 1923 **150**	Sept. 1922 **153**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Oct. 1 1923 **13.10**	Sept. 1 1923 **12.91**	Oct. 1 1922 **12.50**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Oct. 1 1923 **190.8**	Sept. 1 1923 **188.0**	Oct. 1 1922 **175.6**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Sept. 1923 **149**	Aug. 1923 **146**	Sept. 1922 **140**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Sept. 1923 **153.4**	Aug. 1923 **161.6**	Sept. 1922 **155.6**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

North Shore Stock Offered—Remarkable Earnings

Substantial increase in the business of the Chicago, North Shore & Milwaukee Railroad is shown in statements issued on Oct. 18 in connection with the first public offering of $1,500,000 of 7 per cent cumulative prior lien stock of the company. The earnings of the company for the twelve months ended Aug. 31, 1923, as made public in connection with the offer of the stock are as follows:

Operating revenue	$5,677,652
Operating expenses and taxes	4,540,741
Operating income	$1,136,821
Non-operating income	27,298
Gross income	$1,164,119
Fixed charges	504,516
Net income	$659,603

This statement shows that the sum required to pay the dividends on the new prior lien stock was earned more than six times.

The new stock offering is the first since the recent readjustment of the financial structure of the company. Capitalization of the company comprises a funded debt of $8,265,400 and authorized capital stock totaling $20,000,000. Of this $5,000,000 is 6 per cent preferred and $5,000,000 is common stock. This stock is already outstanding, but of the $10,000,000 of prior lien stock only $1,500,000 has thus far been offered.

The business of the North Shore line has quadrupled since 1916. The total operating revenue in 1922 was $5,007,951. The enormous growth of the merchandise dispatch business of the line is shown by the following revenue figures covering this branch of the business:

1916	$62,654
1917	105,572
1918	151,728
1919	219,396
1920	471,496
1921	477,896
1922	738,817

The number of revenue passengers carried last year was 15,204,758. The merchandise dispatch business totaled 355,183 tons.

Pamphlet on British Columbia Electric Railway

The British Columbia Electric Railway, serving Vancouver, New Westminster and Victoria, has just issued a booklet of forty pages, with maps, views and descriptive matter of the line and territory which it serves. The pamphlet is handsomely printed and gives a very good idea of the physical surroundings and of the nature of the business done by the property. Copies have been mailed to the stockholders, which number about 15,000, mostly in England. It is also being sent to a selected list of residents in the home territory of the company.

Although the pamphlet is not primarily statistical, some statistics are given, and those showing the traffic of the company during the last ten years are reproduced below:

TRAFFIC STATISTICS, BRITISH COLUMBIA ELECTRIC RAILWAY

	Passengers	Tons of Freight
1913	71,973,822	448,750
1914	63,494,023	343,944
1915	46,330,096	231,133
1916	43,021,790	218,065
1917	43,232,630	324,280
1918	52,853,373	365,830
1919	53,326,288	331,794
1920	66,411,030	430,931
1921	71,065,275	413,131
1922	69,314,667	321,081

The booklet is profusely and artistically illustrated. It was prepared for publication under the direction of J. Lightbody, who is in charge of all the company's publicity and advertising.

Time Extended for Pittsburgh Reorganization

The Public Service Commission of Pennsylvania has extended until Dec. 1 the date for the reorganization of the Pittsburgh Railways to become effective. The company presented the petition and no objection was presented by the city of Pittsburgh, which is a party to the new arrangement under which the company will operate. The master appointed by the Allegheny courts to make a report on the reorganization has reported as of Oct. 11. According to law, the master's findings must be advertised for thirty days before the court can make an order, and the further extension until Dec. 1 was sanctioned by the commission to meet this requirement.

Hearing on Denver Case Concluded

The hearing has been ended on the application of the Denver Tramway for a repeal of the 6-cent fare. Special master Henry A. Dubbs, who has been sitting in the case, will go over the entire evidence and arguments submitted.

Gerald Hughes, attorney for the tramway, closed the case on Oct. 14 by going over the evidence that the city submitted, especially the appraisal for the city made by Dr. Delos F. Wilcox.

Mr. Hughes said that from 1917 to date the Tramway had not earned anything net; that more than $2,000,000 had been used in betterments and asserted that the physical condition of the system and the service would show that vast improvements had been made. He added that for the city's attorneys to maintain that the tramway lines were losing heavily by natural depreciation was ridiculous as the system's condition would show.

Mr. Hughes answered the arguments of the city's attorneys as concerned franchises. James A. Marsh, for the city, has asserted that there was no perpetual franchise for the company, and Mr. Hughes called attention to the common use of the word "franchise" whereas the word "contract" should be used, and asserted that the company did claim perpetual rights to the use of the streets of the city for street cars.

$2,801,605 Balance After Preferred Dividends

Nesbitt, Thomson & Company, Montreal, are offering $1,000,000 of the 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation, which took over the Illinois Traction Company and other properties. The stock is being offered at the market which is around 92½ bringing the yield to more than 7½ per cent.

A consolidated statement of earnings for the twelve months ended July 31, 1923, has been issued in connection with the issue. It shows:

Gross earnings	$26,973,032
Operating expenses, maintenance and taxes	18,422,770
Net earnings	$8,550,262
Annual interest on total outstanding funded debt	4,492,829
Balance for dividends and amortization.	$4,057,433
Annual dividend requirements on 7 per cent cumulative preferred stock.	1,255,828
Balance	$2,801,605

It is explained that about 70 per cent of the net earnings are derived from power and light.

Money Being Returned to Contributors

Hard luck seems to be pursuing the residents of the territory formerly served by the old Springfield, Troy & Piqua Traction Company operating between Springfield and Troy, Ohio. In the first place the effort failed which was made to secure subscriptions sufficient to keep the road in service and practically all the rails on the west end of the line have been taken up and shipped to the Huntington, W. Va., plant of the Schoenthal Company, Columbus, which purchased the property at its scrap value. As if these were not enough the subscribers who contributed to the fund to refinance the line are confronted with the problem of how best to get back the amount of their subscriptions. The money that had been raised was deposited in the Springfield National Bank, and just before the committee in charge decided to return the money to the various contributors, the bank was closed. Under the first dividend of 33⅓ per cent declared by the receiver, the committee received a portion of the money back and is now engaged in distributing it, but only 25 per cent is being paid to contributors, the difference between that and the bank dividend going to pay various expenses that have been incurred. Meantime, as noted previously practically all of the rails on the west end of the line are being removed.

Merger of Electric Subsidiaries Proposed.—The stockholders of the Public Service Electric Company, a subsidiary of the Public Service Corporation of New Jersey and United Electric Company of New Jersey, will meet on Nov. 5, to vote on ratifying a merger of the two companies. The Public Service Corporation of New Jersey owns nearly all the stock of both companies.

Fare Fund at Lowest Point in Toledo

Car riding in Toledo has taken an increase in October, which indicates that September, with its net deficit of $34,484 for the Community Traction Company, is apparently the bottom for the present year. For the first half of October gross revenue was $6,000 ahead of the same period last month. Gross revenue for September showed an increase of $815 over last year to a total of $301,421, but fixed charges have increased $22,984 and expenses increased $23,068 per month this year as compared with last. Wage increases account for a large part of the expense increase.

Daily average of revenue passengers was 158,598 in September, which shows a decrease from August, with a daily average riding of 161,349 revenue passengers.

Feeder bus operations accounted for a loss of about $455 during the month.

The fare stabilizing fund is now at $85,938. This is the lowest point it has reached since the Milner ordinance has been in effect.

Auction Sales in New York.—At the public auction rooms in New York on Oct. 24 there were no sales of electric railway securities.

New Director Named.—J. L. Perron was recently elected a director of the Montreal Tramways. In this capacity he succeeds J. W. McConnell.

Gold Bonds Offered.—Harris, Forbes & Company and Coffin & Burr, Inc., New York, are offering $6,000,000 Alabama Power Company first mortgage lien and refunding gold bonds, 6 per cent series. The issue is being placed at 99 and interest, to yield about 6.07 per cent.

Preferred Dividend Paid in Cash.—The directors of the American Electric Power Company, Philadelphia, have declared a quarterly dividend of 1¾ per cent on the preferred stock, payable in cash on Nov. 15 to holders of record Oct. 31. The company on Aug. 15 last paid the preferred dividend in preferred stock.

Bonds Offered.—The National City Company and Halsey, Stuart & Company are offering at 92½ and interest, to yield more than 6⅝ per cent, $2,000,000 of the Portland Railway, Light & Power Company first lien and refunding mortgage gold bonds, Series B, 6 per cent. The bonds are dated May 1, 1922, and are due May 1, 1947.

First Mortgage Issue Offered.—Harris, Forbes & Company, New York, N. Y., are offering $1,000,000 of the Iowa Railway & Light Company first and refunding (now first mortgage) twenty-year 5 per cent gold bonds. The bonds, offered at 93 and interest yielding more than 6 per cent, are dated Aug. 30, 1912, and are due Sept. 1, 1932.

Tells of Creditors' Claims.—General Lincoln C. Andrews, receiver of the New York & Queens County Railway, has informed creditors of the company, other than the holders of the first mortgage bonds, that he has in hand $8,010 or less to pay claims aggregating $7,227,017. They were also informed that this amount was liable for city and Federal taxes and for claims that might arise out of the litigation now under way. Two suits are now pending for the foreclosure of two mortgages held against the company each for $1,500,000.

Seeks Discontinuance.—The Sistersville Traction Company on Oct. 5 presented arguments before the Public Service Commission of West Virginia for the discontinuance of its railway service at New Martinsville. The company in asking for authority to discontinue such service in the city claimed that it was operating that part of its line at a loss.

Review of Merger Denied.—The Supreme Court refused on Oct. 22 to review the case in which it was sought to have it determine the effect of street railway consolidation in New York City by the New York Railways upon the lien held by the Irving Bank and the Columbia Trust Company in the form of a mortgage upon the property of the Columbus & Ninth Avenue Railroad, a part of the former consolidated company.

Income and Passengers Increase.—The Philadelphia Rapid Transit Company realized a net income of $1,404,027 for the nine months ending Sept. 30, 1923. This compares with $1,365,129 for the nine months period ended Sept. 30, a year ago. The total passengers carried from January through September of this year was 677,003,228 against 623,972,005 for the same nine months a year ago. The passenger revenue for the nine months of this year was $32,595,400 as compared with $30,645,611 for the nine months ended September, 1922.

City Not Satisfied with Revised Toronto Award.—The city of Toronto will appeal to the Privy Council against the award of the arbitrators to the Toronto Railway in connection with the city taking over the railway at the expiry of its franchise. The award was $11,188,500. The city appealed to the first divisions court against this amount, and the divisional court reduced it by $543,500, being the estimated value of certain street railway property which the city need not take over. This, however, is not satisfactory to the city, and the Board of Control agreed to carry the case to the Privy Council.

Railway Bid In.—T. M. Hayes, Huntington, assistant general manager of the Ohio Valley Electric Company, and John Smith, representing Martin & Smith, Catlettsburg, attorneys for the Catlettsburg Street Railway, bid in that property's franchise on Oct. 15. It was sold at the court house at public auction by C. P. Carpenter, city treasurer and special commissioner appointed to conduct the sale. There being no competitors in the bidding the franchise was knocked down at the first bid of $50. The franchise runs for twenty years.

Will Begin Repayment of Loans.—Having accumulated a cash balance of $301,191, the Seattle Municipal Railway is in a position to begin repayment of loans from various city funds, which were made to the railway two months ago, when it needed cash to meet its payrolls, after the 5-cent fare experiment had exhausted its funds. Superintendent D. W. Henderson recently informed the City Council of this fact. He suggested that loans of $100,000 from the city light fund and $75,000 from the water department, made July 24, be returned. The railway also borrowed from several railway special funds which have not yet been repaid.

Bridge Line Settling Accident Claims.—The balance sheet of the Manhattan Bridge Three-Cent Line, New York, as of June 30, last, shows surplus of $10,759; road and electric line, $147,326; equipment, $117,727; floating capital, $29,613; investments, $74,214; reserve, $100,421; unfunded debt, $31,096, and total assets and liabilities of $592,277. The report states that as a result of the serious accident on May 1, 1923, the reserves for accidents have been used up and before all claims are settled the surplus will be gone. The total amount paid out to Sept. 1, 1923, on account of this accident amounted to $34,593. The company has settled thirty-seven claims and there are seventeen still pending.

Research Bureau Reports on Finances. The Bureau of Government Research, in asking where the $120,000 is to come from for the increased wages recently put in effect on the lines of the San Francisco Municipal Railway, has published in the San Francisco *Chronicle* of Sept. 21 an itemized statement of the railway's income account for the fiscal year, ended June 30, 1923. The total revenue, according to the statement, was $3,013,552, with total operating expenses of $2,301,156. After the consideration of interest on funded debt and reserve for depreciation and account, the excess after all payments amounted to $23,050. The increase of 40 cents a day recently granted to the employees, or a daily salary of $5.40, would increase the expenses of the Municipal Railway $120,000 a year.

Time for Deposit of Saginaw Securities Extended.—Formal announcement was made in New York on Oct. 22 that the reorganization plan for the Saginaw Valley Traction Company, Saginaw, Mich., had been put into effect and the securities of the company are ready for distribution. The protective committee representing the first mortgage gold bonds of the company has extended the time limit for the deposit of bonds under the reorganization plan until Jan. 8, 1924. The committee, consisting of H. M. Addinsell, John R. Macomber and J. W. Hamer, stated that more than 95 per cent of the bonds had been deposited under the reorganization plan. As has been stated before in the ELECTRIC RAILWAY JOURNAL the new company, the Saginaw Transit Company, has acquired and is now engaged in rehabilitating the street railway properties in Saginaw.

Traffic and Transportation

Fare Case Before Court

Special Master Considering Arguments in Houston Fare Fight—Fare Increase Imperative

Hearing of the action brought by the Houston Electric Company against the city of Houston to prevent the city enforcing a 7-cent fare ordinance was begun in Federal court on Oct. 9, before Special Master Hunt. The city is represented by John A. Beeler, who has made a careful survey of the traction properties in Houston.

It was indicated early in the hearing that the company will ask for an 8½-cent fare, on the basis that the 7-cent fare fixed by the city is confiscatory and that a fare of 8½ cents is necessary to enable the company to meet operating costs and yield a fair return on its invested capital.

H. P. Gillette, editor of *Enginering and Contracting*, was the first witness presented by the traction company. He testified that the deficit on which the company based its petition was in the earnings, and not due to any mismanagement or lack of economical operation. The company, he said, is entitled to charge a fare that will enable it to meet its operating expenses, when the lines are economically administered, and to yield a fair return on the invested capital.

Net earnings of the company at present, Mr. Gillette said, constitute a confiscation of property, as the company's books show net earnings varying from one-half of 1 per cent to a maximum of 2¼ per cent of the investment during the last three years.

Estimated cost of reproducing the property of the company as of May 31, 1923, was given by Mr. Gillette as $7,601,588 minus depreciation, with true net earnings of $112,346, or, by the "sinking fund" method of calculation, an earning of only 1½ per cent of the invested capital.

Mr. Gillette then showed that the amount of the alleged deficit for the year ended May 31, 1923, divided by the number of fares collected in the preceding year, showed that to bring revenues up to a point where a fair return on the invested capital would be produced it would be necessary to add 1.7 cents.

The average fare paid in 1922 was 6.8 cents and the added 1.7 cents would produce a fare of 8½ cents.

Reproduction cost now is about 64 per cent higher than in 1914, counsel for the traction company stated to the court, explaining that in 1919 Judge Hutcheson of the Federal District Court allowed a reproduction cost about 33⅓ per cent higher than in 1914 and the Supreme Court had held that the Houston court did not err, although the company attacked this point in its suit.

C. J. Kirk, Public Service Commissioner of Houston, sought to prove that Stone & Webster are overpaid for the work which they do in supervising the operations of the company at Houston.

Service Increases Noted in Chicago

Twice recently Mayor Dever has commended the Chicago Surface Lines for improvements in service. With the installation of all day trailer service on Madison Street on Oct. 14, he again issued a public statement. Trains previously had been operated during rush hours only on other routes, but with the arrival of cars of sufficient motor capacity it became practicable to keep the two-car trains in all-day service. Madison Street is one of the heaviest arteries of travel in Chicago. Its complement now is eighty-nine motor and sixty-six trail cars for weekdays, service having been increased about 20 per cent. Results have been most encouraging to the company as the business continues to grow daily.

Cars in operation on the system have increased 220 since a year ago. Of the 214 new cars ordered some time ago, 184 have been placed in service. Besides, schedule revisions have added the equivalent of thirty-six more cars. Sixty other cars are being built. About 50 per cent of the schedules have been revised since Jan. 1, with the result that 1,525 round trips have been added daily, or more than 6 per cent gain on these changed routes.

Seeks Increased Fare in Oklahoma City

The Oklahoma Railway, operating in Oklahoma City, has asked for authority to increase its fares to 8 cents, and a committee of business men which investigated the financial condition of the company has recommended to the State Corporation Commission that the increase be granted.

John Shartel, general manager of the company, said that the 7-cent fare with four tokens for a quarter now charged is not sufficient to meet operating expenses and that unless relief is granted the company will be compelled to go out of business in Oklahoma City. The traffic has suffered greatly because of the increase in the number of automobiles, Mr. Shartel said.

The company operates interurban lines in three directions out of Oklahoma City and plans to electrify the steam railway from Oklahoma City to Shawnee. Mr. Shartel said that unless relief for the local situation in Oklahoma City is granted the electrification project would be dropped, at least for the present.

Bid for Co-operation

Saginaw Operator Seeks to Impress Business Men with Need for Their Help

"Your job did not end when you approved the franchise; in fact your job just started. From now on you have your biggest job, to help us to make the system all you want it to be, to give the kind of service you want.

"You have an ideal system here—the money supplied to you, and your own people directing the company. Try it, with the help of every man, woman and child in the community. We are at your service, and all we ask of you is patience and co-operation while we are working out the details."

These were the words with which Charles S. Kressler, president and general manager of the Saginaw Transit Company, concluded a speech which he made a few days ago before the members of the Exchange Club. Street railway service in Saginaw has been shut down for two years, and Mr. Kressler knows that he has a tough job ahead of him. He hopes to resume railway service on Nov. 15. The new buses are arriving and they, too will be placed in service soon. Mr. Kressler made no bones about the fact that his talk was a bid for support for the new enterprise. He said some things to business men that might well be repeated elsewhere. Mr. Kressler painted the picture with these words:

"When you consider the transportation problem in a city the size of Saginaw you realize that in a city of 60,000 to 200,000 people there are not enough people who do not own or cannot afford automobiles to support a transportation system properly. Where is the revenue coming from to pay the cost of operation?

"At present many of you get into your autos in the morning and after driving downtown park them in front of your places of business. That space does not belong to you. You should ride to and from your work on the transportation system.

"You are after the business of the farmers, but when the farmers find a place to park downtown they buy in nearby communities, instead of coming to the business center to trade. Within the past few years the business of the neighborhood stores has more than doubled because the people can't find places to park downtown. They buy nearer to their homes. Instead of coming to town frequently to buy, the farmer comes only when it is absolutely necessary.

"It is a merchandising problem, but it also has to do with transportation. I believe that if more attention were paid to that question it would mean proper support to the transit company as well as a profit to yourselves, the appreciation of the farmers and a whole lot better feeling in the community.

"If you drive your own car down to work and back twice a day it will cost you 40 to 60 cents a day, while you can ride on the street car the same number of times for 25 cents. You can't afford to drive your own car when you have a good transportation system—and that is what we are trying to give you. In doing this we want your co-operation. In fact, we must have it if we are to succeed. It is as much your problem as it is ours."

Mr. Kressler expressed the need for greater care about safety, particularly in view of the fact that during the period the street cars were withdrawn autos were permitted to wander all over the streets.

Adopts Traffic Resolution in New Orleans

The Commission Council of New Orleans by a vote of four to one (Mayor McShane dissenting) adopted on Oct. 17 the resolution of Commissioner Paul H. Maloney of the Department of Public Utilities to open up North Rampart Street from Esplande to Elysian Fields.

The widening of North Rampart Street will cost approximately $500,000, one-half of which expense will be borne by the Public Service, Inc., and the other half by the city. In order to hasten the work of improvement the Public Service, Inc., has signified its willingness to advance the entire sum, to be reimbursed later by the city for its share of the expense. For this purpose, the resolution adopted directs the budget committee of the city to set aside $125,000 out of the budget of 1924 and a like sum out of the 1925 budget.

Commissioner Paul Maloney pointed out in his resolution that the annual yield from present grants to the Public Service Inc., together with that derived from an agreement made with the Cumberland Telephone & Telegraph Company, available for municipal improvements would be materially increased in 1924 and 1925 and that this should approximate the total cost of financing the project. The project contemplates widening the street for a lineal distance of 2,900 ft., and it is quite likely that work will be started soon and rushed through to completion.

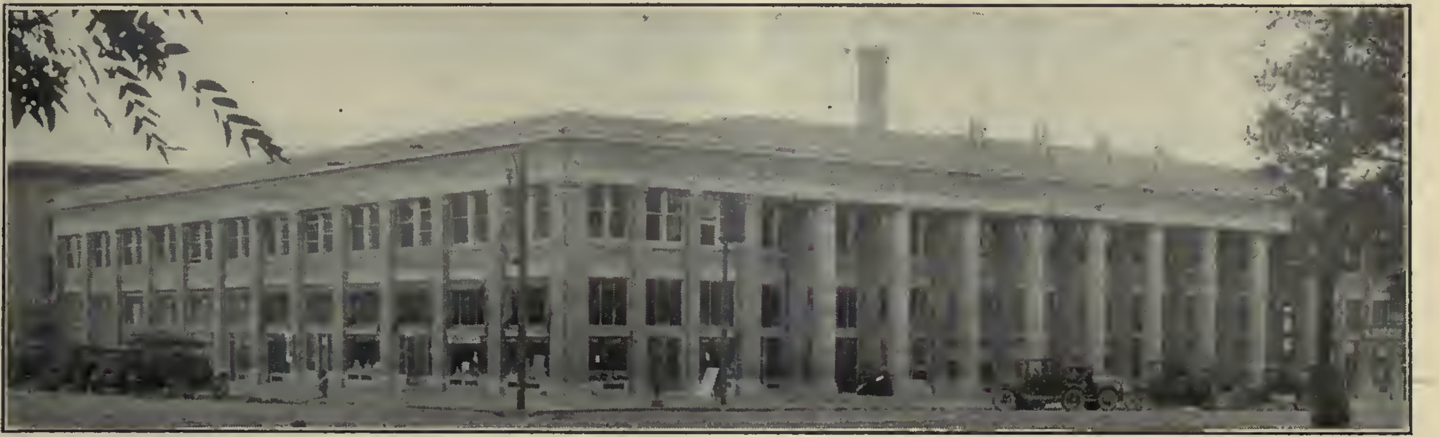
A paragraph in the Beeler report on traffic conditions in the city points out the immense benefits to be derived from this work of improvement, "affording a great artery for all traffic to this important industrial center."

Salt Lake City Has New Interurban Station

The new interurban station for electric railroads of Salt Lake City was formally opened to the public on Oct. 4. Former Gov. Simon Bamberger, chairman of the board of directors of the Bamberger Electric Railway, with other officials of that road and of the Orem Electric Railway, were on hand. All officials were commissioned as ushers and guides. A thorough inspection of the structure was made by a large number of guests.

The big waiting room, which is 125 x 42 ft. in dimension, with a ceiling two stories high, was specially decorated and lighted for the occasion, and all other parts of the new building were in festive garb.

The building, which is the local terminal of the Bamberger and Orem lines, was constructed by the two electric roads at a cost of $300,000. The second story is divided into offices, including those of the traffic and operating departments of the two roads. On the first floor the waiting room and ticket office, which are handsomely finished in marble and tile, occupy the central position, while at the south end of the building there are offices and stores facing the street.



Railway Station and Office Building at Salt Lake Adds Greatly to City's Attractiveness

The Bamberger Electric line was started in 1890 by its present head. It was built as far as Lagoon in 1895 and into Ogden in 1908 and was electrified in 1910. The Orem electric line was started in 1911 and completed as far as Payson, Utah, about three years later.

Expedites Freight Deliveries

The electric lines play an important part in a campaign for better and more rapid and efficient freight service to towns and cities served by Fort Wayne jobbers and shippers. In a systematic effort to expedite shipments and provide "next morning deliveries" to towns in this territory, the traffic and transportation bureau of the Chamber of Commerce, in co-operation with the Fort Wayne Traffic Bureau, has arranged a schedule to provide rapid service over the electric railways to points between Fort Wayne and Lafayette, Ind., on the south, and Warsaw, Goshen and South Bend, Ind., on the west. The schedule, it is announced, will make possible next morning deliveries to points south, as well as at Warsaw and Goshen, with noon deliveries at South Bend. Freight destined for this service may be delivered at the electric railway freight terminal up to 4 o'clock in the afternoon.

Wyandotte Division of Detroit United Reopened

Interurban service was resumed on Oct. 20 on the Wyandotte division of the Detroit United Railway. The road has been shut down since August, when the city of River Rouge obtained an injunction restraining the company from operating through that municipality. The injunction was issued when the railway company attempted to increase fares.

The resumption of service was the result of an order issued by Judge Henry A. Mandell in the Circuit Court directing the railway to sign bonds for $25,000 pending the outcome of litigation started by the township of Ecorse, one of the down-river communities served by the Wyandotte division.

Plans for resuming car service between Detroit, River Rouge, Ecorse, Wyandotte, Riverview, Sibley and Trenton were about completed when a new barrier was raised by the Ecorse Township Board. It was claimed by the board that the railway owed more than $20,000 as the company's share of the expense of a bridge connecting Ecorse and Wyandotte. Ecorse backed up its claims by nailing planks across the company's tracks on the bridge and guarding the bridge.

The bridge was erected about eight years ago and it was claimed by the Ecorse officials that at the time the bridge was built the work was done with the understanding that a friendly suit was to be started against the railway to determine what proportion of the cost should be paid by the company. The suit, it is claimed, was never called, and Ecorse officials refused to accept settlement offered by the company. The question was raised as to whether the company was legally bound to pay anything toward the expense of the bridge, the contention being made that the claim was outlawed according to the statute of limitations.

Report on Louisville Fund After Jan. 1

Charles Roser, auditor of the Public Utilities Bureau of Louisville, stated that there would be no report issued on the barometer fund of the Louisville Railway until some time after Jan. 1. Because of several questions about the matter, he has explained the working fund and the chances for a lower fare for Louisville citizens in the future. Mr. Roser said that under the ordinance providing for the barometer fund the Louisville Railway created a cash fund of $350,000 on Jan. 1, 1923, so that computation was based on that amount. If at the end of any operating period the fund exceeded $500,000 the fares were to be decreased. When the barometer fund reached $500,000 the public should get the first benefit in the reduction of fares.

He said that the report would be made some time after Jan. 1, 1924, as the period on which this report will be based ends Dec. 31, 1923. He said also the stockholders of the railway would get the benefit of an increase in the barometer by a rate of return on the common stock. When the barometer fund exceeded $500,000 he said that the excess would be withdrawn and one-third of the excess paid into the city treasury, one-third to the company to be distributed among its employees and one-third retained by the company as corporate funds.

Six-Cent Fare Extended.—The City Council of Richmond has extended the 6-cent fare on the lines of the Virginia Railway & Power Company for six months. The company began operating under the extended privilege on Oct. 11.

Eight-Cent Fare Asked in Tulsa.—The Tulsa Street Railway, Tulsa, Okla., reports to the Corporation Commission an operating loss of $15,910 in the first seven months of 1923, $4,407.61 of which was incurred during July. An 8-cent fare is asked.

Fares to Be Advanced.—Fares in Iowa City will be advanced to 7 cents. The Mississippi Valley Electric Company announced that it can no longer afford to operate on a 5-cent fare. Local bus lines also will increase their fares. Car and bus tickets will be sold at the rate of four trips for a quarter.

Will Extend Freight Service.—Wide extensions in freight service on the Tiffin & Fostoria Railway, Tiffin, Ohio, line are soon to be put into effect. Through freight service from Tiffin to Cleveland went into effect on Sept. 20 and through service to Dayton and Cincinnati will be put into operation soon.

Ride for One Cent. — The Danville Traction & Power Company, Danville, Va., designated Sunday, Sept. 30, as "1-cent fare day." On that day the public was allowed to ride on any street car for 1 cent. The purpose was to give the patrons an opportunity to inspect five new double-truck cars which were put in operation on that day.

One-Man Cars Up to Voters.—Plans are being made by local labor unions of Sacramento to place on the ballot at the coming municipal election in November a measure pertaining to one-man car service. Conferences were arranged recently by the city at which were present officials of the Pacific Gas & Electric Company and representatives of the local labor unions.

Wants to Operate a Bus Line.—The Pennsylvania & New Jersey Railway has filed with the Trenton City Commission a petition to establish a bus line that will operate between Trenton, N. J., and Morrisville, Pa., in co-operation with the present electric railway service. The company wants to establish a terminus in the center of Trenton and run buses over the Delaware River bridge. The fare will be the same as charged by the railway, with transfer privileges to the trolley company.

Commission Protects Railway from Competition. — The Corporation Commission of Oklahoma has denied the application of J. E. Clark for a certificate of public convenience and necessity to operate a motor vehicle between Muskogee and Fort Gibson. In so doing the commission sustains the protest of the Muskogee Electric Traction Company, which stated that it now furnishes a full and complete service to passengers between those points, and that no necessity existed for additional transportation service.

Keeps Way Clean.—An effective remedy has been found by the Rockford & Interurban Railway, Rockford, Ill., for keeping the right of way free from weeds, grass, etc., in an improvised mower, hooked on behind the trolley car. The attached mower is fitted with standard wheel equipment, a seat is attached for the operator and two scythes are placed in wing fashion on the right and left side of the rails, the trolley car in front pulling the mower. The mower is similar to the one described in the Electric Railway Journal for Oct. 6, page 569.

Bus-Trolley Service.—A contract has been let by the Monongahela-West Penn Public Service Company as a preliminary to operating a bus service between Rivesville and Morgantown, W. Va. It will be possible for persons desiring to make the trip between Fairmont and Morgantown to obtain a combination ticket that may be detached for carfare on the trolley cars between Fairmont and Rivesville or Rivesville and Fairmont, so that the fare between Morgantown and Fairmont will be 91 cents. All buses will be met at Rivesville by cars of the Monongahela-West Penn Public Service Company.

Will Continue Through Business Center.—According to an order of Edwin M. Walker, president of the Schenectady Railway, service on the Albany-Schenectady interurban line will continue through the business district of Albany and turn at the Fulton Street loop, as a means of accommodating merchants and shoppers. Heretofore all local Albany cars turned at the waiting room, but it was found out following the traffic survey that the continuation of the schedule to include the downtown district was more than warranted. Mr. Walker in announcing the change said he believed that the interests of the public and those of the company were mutual and that he thought the new plan would prove popular generally.

City Bus Line in Prospect.—A municipal bus line is to be established in West Seattle, between the end of the Alki car line and Lincoln Beach. A citizens' committee is to raise $4,500 of the purchase price of a bus, estimated at $7,000, and the Seattle Municipal Railway will then buy the bus and operate it. According to an opinion of Walter B. Beals, assistant corporation counsel, sent to D. W. Henderson, superintendent of railways, the Municipal Railway is not empowered to establish automobile bus service under the local improvement district plan of financing street railway extensions, authorized by the 1923 Legislature.

Safety Assured. — The Tennessee Legislature recently passed an act to insure the public safety at all grade crossings of interurban railroads (outside of the limits of corporate municipalities) on all highways in Tennessee now designated by the State Highway Department as main traveled ways and incorporated in the general highway plan of the State. Under House bill No. 122, Acts of 1923, all interurban trains either freight or passenger, must come to a full stop 25 ft. before all grade crossings in the state and shall not proceed until track is clear of vehicles and pedestrians. The railroads cannot rely on the defense of contributory negligence on the part of person or persons injured or owning the property damaged. Violation of the above act is a misdemeanor punishable by a fine of not less than $25 or more than a $100 or by fine of not less than thirty days.

Commission Seeks Solution. — The Traffic Commission of Los Angeles has asked a committee of engineers to furnish it its joint opinion as to what form of subway construction should be adopted to solve the city's traffic congestion problems. The question is whether to adopt a subway system with a central terminal station, a loop system or a diffusive distribution of subway stations. The committee to decide the question is composed of Richard Sachse, street railway expert; Samuel Starrow, nationally known consulting engineer; Franklin D. Howell, public utility expert and chief engineer of the Motor Transit Company of Los Angeles; H. Z. Osborne, formerly chief engineer, Los Angeles Board of Public Utilities, and Alvaro Pratt, subdivision and traffic engineer. The Pacific Electric and Los Angeles Railways, operating the local street car lines serving Los Angeles, have each prepared tentative plans of a proposed subway system.

Personal Items

C. L. Crabbs Retires from Brooklyn-Manhattan

C. L. Crabbs, for seventeen years in the way and structure department of the Brooklyn Rapid Transit System, has resigned as chief engineer of way and structure. Mr. Crabbs has been one of the department heads of the Brooklyn Rapid Transit System since 1909. He joined the organization in 1906 as principal assistant engineer in the way and structure department, when W. S. Menden was chief engineer. Prior to this connection he had been associated with Mr. Menden in engineering work in Chicago during the construction of the Metropolitan West Side Elevated Railway. In 1909, when Mr. Menden was appointed general superintendent of the Brooklyn Rapid Transit System, Mr. Crabbs was promoted to the position of engineer way and structure, and on Jan. 1, 1920, was appointed chief engineer way and structure.

His engineering career began in Chicago in the employ of General William Sooy Smith, and in May, 1892, he joined the staff of engineers engaged in the construction of the Metropolitan West Side Elevated Railway in Chicago. When the "L" construction work was completed, Mr. Crabbs resigned and in 1897 entered the Chicago civil service, first as construction engineer on the Hyde Park sewer system and later as engineer in charge of tunnel construction for the city's water supply system. From 1900 to 1906 he was engaged in the construction of a dock and terminal project along the Hudson River waterfront in Manhattan, and also did some supervisory work in connection with the construction of a factory in Moline, Ill.

Mr. Crabbs was born in Decatur, Ind. He studied engineering at the University of Illinois, from which he was graduated in 1890 with the degree of B S. in civil engineering. He will establish his home in Florida. On Sept. 26 members of his department presented Mr. Crabbs with a gold watch and chain.

Mortimer E. Cooley Resigns Presidency of Engineering Council

Mortimer E. Cooley, dean of the College of Engineering and Architecture of the University of Michigan, has resigned as president of the American Engineering Council of the Federated American Engineering Societies. In presenting his resignation Dean Cooley said that he retires on account of ill health. He also made it known that he has been granted leave of absence by the university for the second half of the academic year of 1923-1924. With his retirement as principal executive of the Engineering Federation Dean Cooley rounds out a career of almost half a century in the service of the state, of education and of his profession. Dean Cooley's successor will be formally chosen at the annual meeting of the American Engineering Council, in Washington, D. C., early in January.

Henry F. Merker Appointed Head of B.M.T. Way and Structure

Henry F. Merker has been appointed engineer of way and structure of the surface lines of the Brooklyn-Manhattan Transit Corporation, successor to the Brooklyn Rapid Transit Company, and has direct charge of all work of the way and structure department on the properties of the surface companies. Mr. Merker goes to Brooklyn from St. Louis, where he was construction engineer for the Missouri Rolling Mill Corporation for about two years. For a similar period he held the position of field engineer for the St. Louis Coke & Chemical Company at Granite City, Ill. From 1905 to 1919 he was engineer of maintenance of way for the East St. Louis & Suburban Railway.

H. F. Merker

Mr. Merker was born in Belleville, Ill. He was graduated from the University of Illinois in 1898. Prior to his joining the staff of the East St. Louis Railway, he was city engineer of Belleville, engineer in charge of power plants at Muskogee and Enid, Okla., and also served on the engineering staff of the Illinois Central Railroad and the Terminal Railroad Association of St. Louis.

Henry J. Kolb has been made engineer of way and structure, New York Rapid Transit Corporation, with direct charge of the way and structure department work on the rapid transit lines and for the South Brooklyn Railway. He has been connected with the engineering department of the system since 1904. In March, 1913, he was appointed engineer of design of the New York Municipal Railway in connection with the carrying out of the construction work under the dual subway contracts with the city of New York. In 1919 he was appointed engineer of construction in charge of engineering design and construction and in January, 1920, was appointed assistant chief engineer way and structure.

Mr. Kolb received his technical education in the Massachusetts Institute of Technology. He has been connected with the maintenance of way department of the New York, New Haven & Hartford Railroad at Boston; has been identified with the Kansas City, Mexico & Orient Railway, Chihuahua, Mexico, and has been associated with the Pennsylvania Steel Company at Steelton, Pa. He was employed two years prior to May, 1904, as a designing engineer by the New York Central Railroad on the design of the engineering track arrangement of the Grand Central Terminal improvements in New York City.

Harry W. Cushman has been appointed transportation superintendent of the Saginaw Transit Company. He has held the position of assistant superintendent with the Tri-City Railway of Davenport. Mr. Cushman was honored by Davenport railway employees with a farewell party, at which a handsome gold watch was presented to him.

Raymond C. Lenahan has been appointed general manager of the Buffalo & Lackawanna Traction Company, Buffalo, N. Y., to succeed Nelson H. Brown, resigned. Mr. Lenahan was general manager of the Depew & Lancaster Railway, operating a short interurban line from Buffalo to Cheektowaga, Depew and Lancaster. He has resigned as manager of this line, but still retains his place on the board of directors.

M. T. Montgomery has resigned as superintendent of transportation for the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, effective Nov. 1. Mr. Montgomery was formerly general superintendent of the Atlantic & Suburban Railway at Atlantic City, N. J. Prior to that he held executive places with the Pittsburgh Railways, was superintendent of a traction line in Mexico City and later manager of a railway at Monterey, Mexico.

H. F. Cameron, who has been serving as manager of the Arkadelphia-Malvern district since C. P. Couch was transferred to the active vice-presidency of the Mississippi Power & Light Company, at Jackson, Miss., has resumed his position as new business manager. J. E. Couch has been made manager of the Arkadelphia-Malvern district. He was formerly with the Southwestern General Electric Company in Texas, and has had years of experience in the industry.

C. E. Blee has been appointed chief assistant to E. E. Carpenter, recently appointed consulting engineer of the British Columbia Electric Railway in Vancouver. Mr. Blee has worked on the construction of the Copco dam of the California Oregon Power Company, being with that company since 1916, with the exception of a year when he served as assistant professor in the department of civil engineering at Stanford University. He was assistant engineer of the California Oregon Power Company at the time of his recent appointment.

M. R. Frederickson, who has been in charge of the Wisconsin Valley Electric Company at Tomahawk as division manager for the last few years, has been promoted to take over the duties of commercial manager of the company at Wausau. He will be succeeded at Tomahawk by Ralph Lillie, who has been in charge of the purchasing department of the company for many years. In his new capacity Mr. Frederickson, will succeed E. V. Pryor, former commercial manager of the company, who resigned to become connected with the Altofer Brothers Company of Oakland, manufacturers of the A.B.C. electric washing machine. The Wisconsin Valley Electric Company owns and operates extensive electric railway properties in the north central part of Wisconsin.

L. B. West has resigned as auditor of the Pine Bluff Company. Early in the present year when Mr. Longino was made manager Mr. West relieved him of some of the details of this office. Mr. West has been identified with the Arkansas Company for several years. He was a member of the Arkansas force when the properties were acquired from Ford, Bacon & Davis. When Byron C. Fowles, secretary-treasurer, general superintendent and purchasing agent of the Pine Bluff Company, resigned to become general manager of the public utilities in Kingsport, Tenn., in 1917 Mr. West went to Kingsport with him, and when Mr. Fowles returned to Arkansas Mr. West also returned and was made auditor. He plans to leave shortly for the west.

A. R. Delo has been appointed line foreman on the lines of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, Pittsburgh, Pa. He was recently with the Duquesne Light Company for a period of two years, having previously served as line foreman with the Citizens Light, Power & Traction Company, Oil City during the years from 1900 to 1906. In the latter year he served in a similar capacity with the Franklin Electric Company, and remained there until 1915, at which time he entered the services of the Ridgeway Electric Company at Ridgeway, Pa. He left the latter concern in 1921 to become associated with the Duquesne Light Company. Mr. Delo succeeds John J. Tesh, who resigned as line foreman after having served the company for nine years.

T. J. Lucas

T. J. Lucas and E. S. Hight New Illinois Power Appointees

Two important appointments to the official roster of the Illinois Power & Light Corporation were announced recently by William A. Baehr, vice-president and general manager.

Thomas J. Lucas, electrical and gas engineer of many years' experience and widely known in the public utilities field, was appointed chief engineer, and E. S. Hight, electrical engineer, was made general operating engineer of the big corporation. The headquarters of both will be at Chicago.

For the last fourteen years Mr. Lucas has been associated with the William A. Baehr organization, consulting engineers, Chicago. He has been active in the direction of the engineering work of the Illinois Power & Light Corporation since the organization of this company on June 1, this year, formed by the consolidation of numerous public utility companies of the Middle West, among them the Illinois Traction System.

Mr. Hight is an engineer well known in the field in Illinois. For a number of years he was chief operating engineer of the Illinois Traction Company, with headquarters at Peoria, Ill. He will finish construction of the Topeka, Kan., power house, the transmission line from Topeka to Atchison and the construction work under way at the Venice, Ill., power house, properties of the Illinois Power & Light Corporation, and will also be responsible for efficiency and operation of the various power plants of the company.

E. S. Hight

Obituary

Charles P. Steinmetz

Dr. Charles Proteus Steinmetz, chief consulting engineer of the General Electric Company, died at Schenectady on Oct. 26, after a very brief illness. Dr. Steinmetz was taken sick during a recent visit which he made to the Far West, and although he recovered sufficiently to make the return trip to the East, the attack of illness which he suffered in the west proved fatal because of the patient's lowered resistance.

Dr. Steinmetz was an engineer-scientist whose gifted genius was widely reflected in electrical and chemical experimentation, research and design. His ability was recognized everywhere, and on old and new problems alike his opinions were eagerly sought. His most constructive work was done, perhaps, in connection with the development of alternating current motors, generators, converters, regulators, lighting and the like. His contributions to the advancement of electrical science and indirectly to humanity will probably never be fully appraised.

Dr. Steinmetz was born April 9, 1865, at Breslau, Germany. He was educated at the Breslau gymnasium and university, studying mathematics, astronomy, physics, chemistry and other branches including economics. In Switzerland he studied mechanical engineering at the Polytechnicum of Zurich. In 1889 he came to America and secured a position with the Eickemeyer Manufacturing Company, first as draftsman then as electrical engineer and designer, and finally on research work in charge of the Eickemeyer laboratory. With the absorption of the Eickemeyer interests by the General Electric Company, Dr. Steinmetz was attached to H. F. Parshall's calculating department in Lynn, Mass. When the company's headquarters were transferred to Schenectady, N. Y., in the spring of 1894, he organized and took charge of the calculation and design of the company's apparatus and of the research and development work. Since 1902 he has been professor of Electrical Engineering at Union University, at the same time retaining his connection with the General Electric Company as consulting engineer, organizing and assuming charge of its consulting electrical department in 1911.

Dr. Steinmetz was a fellow of the American Association for the Advancement of Science, a member of the Mathematical Society and of the Physical Society. He was a past president and member of the American Institute of Electrical Engineers. He was the author of more than a score of books and of numerous scientific papers.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Small Increase in Use of Wood Preservatives

There has been a relatively small gain in the total amount of timber treated in the United States during the past ten years, according to data compiled by the United States Forest Service, in co-operation with the American Wood Preservers' Association. The total for 1913 was 156,613,888 cu.ft., while that for 1922 was 166,620,347 cu.ft., an increase of only a little more than 6 per cent. During the same period the number of treating plants increased from 93 to 128, or more than 36 per cent. The figures show a decided falling off in 1922 over 1921, in which year there was treated a total of 201,643,228 cu.ft. This was probably due to financial retrenchments on the part of the railroads, the car shortage and the coal situation.

The number of ties treated in 1913 was 40,260,416, as commpared with 41,316,474 in 1922, although 55,383,515 were treated in 1921. On the other hand, only 142,069 poles were treated in 1913, as compared with 966,400 in 1922, and there was also a decided increase in the extent of treatment of structural timbers, 138,843,536 ft. B.M. having been treated in 1913, as compared with 152,556,960 ft. B.M. in 1922. Of the ties treated in 1922, nearly 50 per cent were treated with creosote and about 42 per cent with zinc chloride, while the balance were mostly treated with a mixture of zinc chloride and creosote. The total consumption of creosote oil decreased from 108,373,359 gallons in 1913, of which 2,165,736 gallons, or 4 per cent, were imported, to 86,321,389 gallons in 1922, of which 35,462,238 gallons, or 41 per cent, were imported. Zinc chloride, on the other hand, showed an increase in consumption from 26,466,803 lb. in 1913 to 29,868,639 lb. in 1922, the figure for 1921 having been as high as 51,375,360 lb. This indicates a very marked increase in the extent of the use of zinc chloride as a preservative, either alone or in combination with creosote or other preservatives.

Westinghouse Shows Gain

Orders of the Westinghouse Electric & Manufacturing Company for the quarter ended Sept. 30 amounted to $41,940,000, compared with $37,453,000 for the corresponding period last year and $47,649,000 for the quarter ended June 30, 1923. Sales billed for the three months ended Sept. 30 were $38,619,500, against $30,291,800 in the 1922 period and $35,094,800 in the first quarter of this year ended June 30.

For the first half of its fiscal year Westinghouse booked $89,589,100 new business, an increase of 28.8 per cent over the corresponding 1922 period. Total incoming orders for last year were $152,328,564. Billings for the half year amounted to $73,714,300, topping 1922 by 31.6 per cent.

Lumber Specifications Available

Recommendations from the Department of Agriculture for the standardization of grading specifications for yard lumber and for structural timbers will soon be available in circular form. Distribution of the circulars will probably be from the Forest Products Laboratory at Madison, Wis. The first editions, consisting of a few thousands each, will be distributed free on request as long as the supply lasts. In order to make the distribution as effective as possible, the laboratory will give priority to all direct requests received now, before the circulars are sent out to its general mailing list.

World Production of Coal, January-June, 1923

A summary of the data received by the United States Geological Survey up to Oct. 15 shows a total of approximately 666,000,000 tons of coal produced during the first half of 1923. This is an increase of about 79,400,000 tons, or 13.3 per cent, over the corresponding period of last year. Nearly all the countries listed have increased their production, the most notable increases being in the United States, United Kingdom and Poland. The proportion contributed by the United States was 44 per cent of the total. The accompanying table gives the figures.

PRODUCTION OF COAL IN PRINCIPAL COUNTRIES OF THE WORLD, JANUARY-JUNE, 1923.

(In metric tons of 2,204,622 lbs.)

Country	Metric Tons	Per Cent of Total
North America:		
Canada	7,912,610	1.19
United States	294,261,000	44.18
Europe:		
Austria: Coal	74,698	.01
Lignite	1,242,196	.19
Belgium	11,127,700	1.67
Czechoslovakia: Coal	5,919,835	.88
Lignite	8,725,861	1.31
France: Coal	17,659,350	2.65
Lignite	433,741	.06
Hungary	3,807,521	.45
Netherlands	2,686,246	.40
Poland	21,680,056	3.25
Russia	5,609,000	.84
United Kingdom	143,051,102	21.50
Asia:		
British India	10,074,000	1.51
Japan	13,745,000	2.06
Africa:		
Rhodesia	250,447	.04
Union of South Africa	5,222,674	.78
Total	666,000,000*	100.00*

* Germany, South American countries and others not shown individually are included in the total.

Electrification Progress in Mexico

Orders have been placed with the International General Electric Company for an 11,250-kva., 4,000-volt waterwheel generator to furnish power for the electrification of the Maltrata Incline of the Mexican Railways, contract for which was let to this company recently. More than 50,000 kva. in water-cooled 60-cycle transformers designed for 42,000 volts primary are also included in this order. This is the second important step in beginning electrification. Shipment has been completed from Schenectady and Erie of the overhead line equipment, including trolley wire, feeder hangers, etc.

The 3,000-kw., 3,000-volt motor-generator sets for the substation to be located near the center of the electric division will be the largest ever constructed for this voltage. These are now being assembled for test, while the locomotives are themselves nearing completion at the company's Erie works.

General Electric Will Buy the Canadian General Electric

The directors of the Canadian General Electric Company have unanimously approved the offer made by the General Electric Company for the purchase of the stock of the first-mentioned Company. It appears that only the formal ratification by the stockholders is necessary to consummate the agreement.

A question has been raised in regard to the probable disposition of the subsidiary companies in Canada, particularly the Allis-Chalmers Company, which has factories at Toronto, Montreal, Bridgeburg and Stratford. These plants were greatly expanded during the war, but recently have been unprofitable.

The Canadian General Electric Company has an authorized capitalization of $18,000,000 of common stock, of which $10,800,000 is outstanding. There is also $2,000,000 of 7 per cent cumulative preferred stock outstanding. It is thought likely that the agreement will include a stock conversion feature. In order to give the stockholders ample time to consider the offer special stockholders' meetings will probably not be held before the latter part of this year.

Metal, Coal and Material Prices

Metals—New York	Oct. 23, 1923
Copper, electrolytic, cents per lb.	12.687
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.85
Zinc, cents per lb.	6.65
Tin, Straits, cents per lb.	41.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.575
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.45
Central, Ill., screenings, Chicago, net tons	.925
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.95
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.99

Rolling Stock

Long Island Railroad, New York, N. Y., has placed the contract for motors and control apparatus for sixty new cars with the Westinghouse Electric & Manufacturing Company. Each car will be equipped with two 225-hp. motors arranged for multiple-unit control. This new equipment, which involves approximately $600,000, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 22, 1923.

Track and Line

Northern Texas Traction Company, Fort Worth, Tex., has completed a feeder line to supply current for operation of cars on the Seminary Hill Line.

Los Angeles Railway, has started work on reconstructing the West Forty-eighth Street track between Gramercy and Van Ness. The reconstruction of Hill Street from Fourth to Eighth has been completed.

Saginaw Transit Company has placed track orders for March 1 delivery. The company will then proceed with replacements which have been ready for the junk yards for many months.

Tama & Toledo Railroad, Toledo, Iowa, is tearing up its old rails at Toledo and is replacing them with heavy steel. The rails are being welded. Concrete and cement filling is being put in at the end of the ties instead of the old brick.

Connecticut Company is ready to double track the construction through Capitol Avenue in co-operation with the city betterment project of widening that street. The Capitol Avenue widening calls for widening the thoroughfare from Main Street to Trinity Street.

Harrisburg Railways has completed construction of work on North Cameron Street between Calder and Maclay Streets. Construction extends for a distance of 2,850 ft. and costs the company approximately $30,000. The work was accomplished within twenty days.

Dallas Railway has been granted a requisition for construction of the new line in Oak Cliff. The new line will begin at Tyler Street and Jefferson Avenue, extending southward along Tyler Street to Burlington Boulevard, westward along Burlington Boulevard to Waverley Drive. The cost of the new line is estimated at $200,000.

New York State Railways has applied to the Public Service Commission for permission to build and operate a single track extension of its lines from the present terminal in Salina along the Syracuse-Bridgeport highway, a distance of 2,200 ft., thereby forming a loop. The extension is to afford transportation facilities to a large factory about to be constructed along the company's lines.

Wilkes-Barre Railway will install new double tracks on West Market Street from the Public Square to River Street, just as soon as the Goeringer Company has the street in readiness for the work. After the double-tracking is done, the street will be repaved with sheet asphalt. The work will be rushed with all possible haste. With the new improvement will come the removal of all poles and wires.

Kansas City, Clay County & St. Joseph Railway, Jefferson City, Mo., will pay $7,304 of the cost of an overhead crossing on the State Road from Liberty to Excelsior Springs. This is in accordance with an order previously issued by the Public Service Commission requiring the company to pay one-half of the estimated cost. The total project is estimated at $14,608. The bridge will be constructed under the direction of the Highway Commission.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has placed an order with the Buda Company for special trackwork layout to be installed at the railway's carhouse at Third Avenue, Tenth and Eleventh Streets, Birmingham. This layout consists of fifty-five branchoffs, and is probably the largest single layout purchased in the southeast for a number of years. Construction is to be of the new A.E.R.E.A. 7-in. guard rail with solid manganese switches.

New York, N. Y.—The Transit Commission will receive bids on four important rapid transit contracts on Nov. 2, constituting the largest amount of contract work upon any one occasion since the time of the construction of the dual system of rapid transit. Two of the contracts cover the construction of a portion of the Flushing extension of the Corona branch of the Queensboro subway. A third contract calls for the removal of the kiosks which block the curb line and encroach upon the roadway of Broadway at the 157th Street Station of the Interborough Rapid Transit Company. The remaining contract for which bids will be received is for frogs, switches, tracks, etc., for the 180th Street yard of the Interborough, adjacent to Bronx Park.

Power Houses, Shops and Buildings

American Electric Power Company, Wilmington, Del., has bought two Westinghouse new model multiple-retort underfeed stokers.

Texas Electric Railway, Dallas, has begun work on a new passenger and express station at Ennis. James P. Griffin, vice-president of the company, in announcing the beginning of work on the new station, said it would cost $17,000 and is to be completed by Jan. 1.

United Light & Railways Company, Grand Rapids, Mich., is contemplating a central power station in the vicinity of East Moline, Ill., with a capacity of at least 150,000 kw. and to cost approximately $10,000,000 when completed. The United Light & Railways power plant is now located at Moline, Ill., where it is in close proximity to a hydro-electric station. This combined central station, while recently expanded, will not be able to serve the rapidly growing demands of this industrial community for electrical energy and the new plant is made necessary to provide for the industrial development of the next decade.

Trade Note

Westinghouse Electric & Manufacturing Company at its South Philadelphia Works has established a general engineering division which will be devoted to the study of central-station and industrial plant problems, which involve the application of steam power apparatus such as steam turbines, condensers and reduction gears. This department will also co-operate with the sales organization in providing engineering service to purchasers of this equipment.

New Advertising Literature

Ohmer Fare Register Company, Dayton, has issued form 400, entitled "Making Money by Saving Money."

Economy Electric Devices Company, Chicago, has issued a sheet—a reprint from *Electrical Traction*—entitled "The Air Rectifier Eliminates Frozen Air."

Hauck Manufacturing Company, Brooklyn, N. Y., has issued bulletin No. 506, illustrating and describing the new Hauck Venturi low-pressure burners.

Combustion Engineering Corporation, New York, N. Y., has issued Catalog L-1, entitled "Lopulco Pulverized Fuel Systems." The pamphlet explains the Lopulco system as designed for stationary boilers.

Hale-Kilburn Company, Philadelphia, Pa., has issued a forty-page pamphlet on car seats for electric railways. The various designs of seat types for car equipment are described in detail with photographs giving the standard features of the particular type of seat.

Torchweld Equipment Company, Chicago, has issued a new catalog covering its complete line of oxyacetylene welding and cutting apparatus, lead welding, soldering, brazing and decarbonizing units, gas pressure regulators, automatic machines, generators and supplies. The catalog contains cross-sectional views of equipment with detailed explanation, is 8½ in. x 11 in. and consists of forty pages.

Garland Ventilator Company, Chicago, represented by Hegeman-Castle Corporation as general agents, has issued a twelve-page circular descriptive of the Garland steam and electric railroad ventilators. In a list of thirty-six typical orders recently received by the company are included sixteen from electric railway car builders and prominent electric railways. A list of representative railroads using Garland ventilators includes fifteen electric railways.

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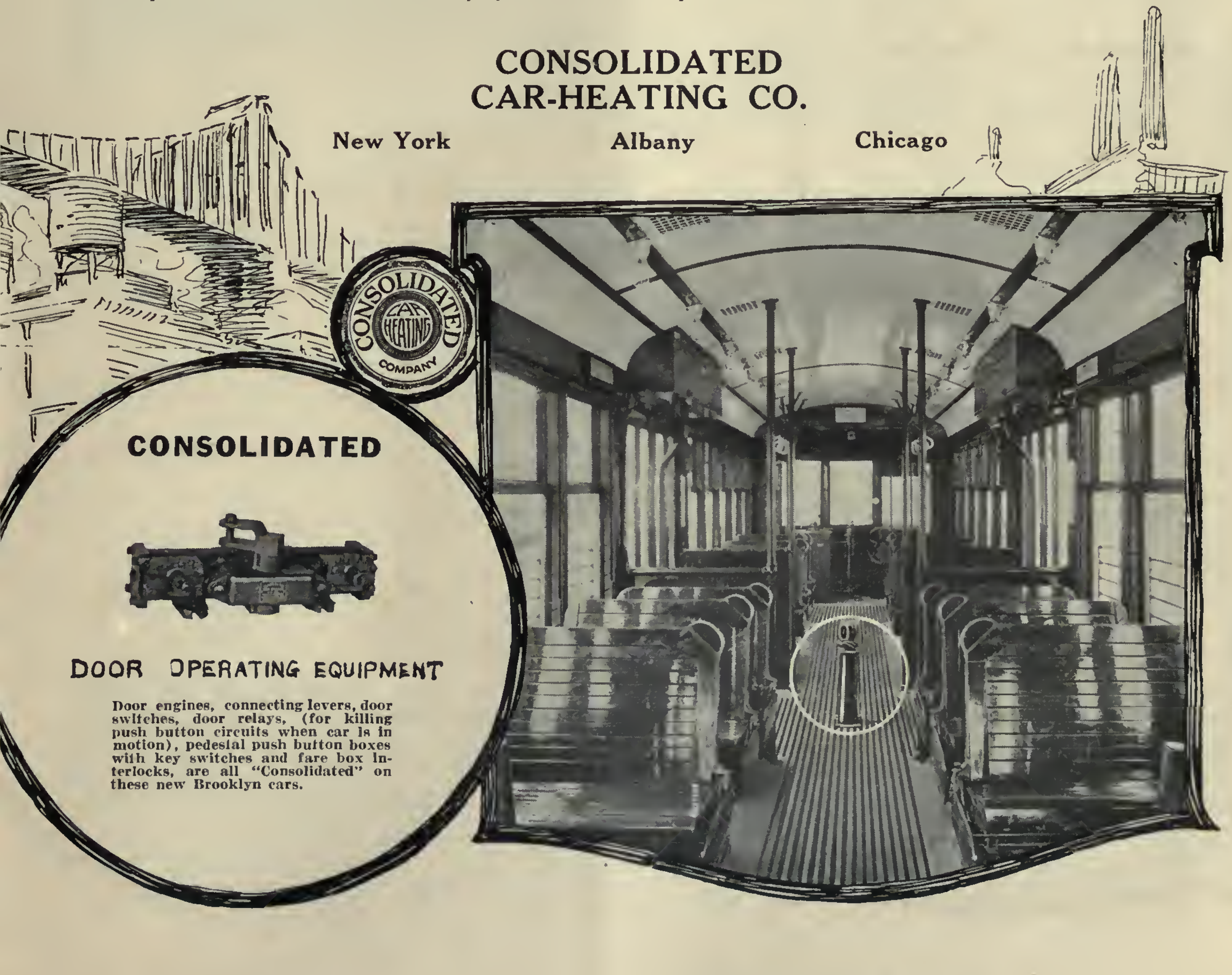

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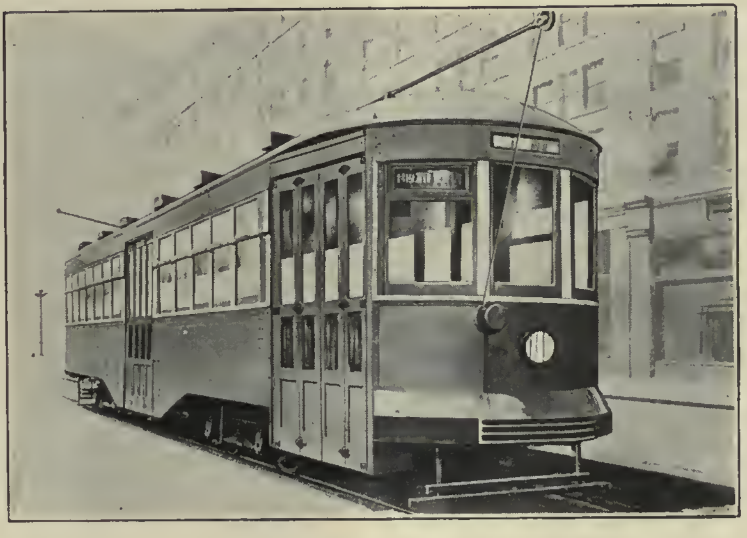

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It pays to investigate and to get quotations from the St. Louis Car Company on any car construction job.

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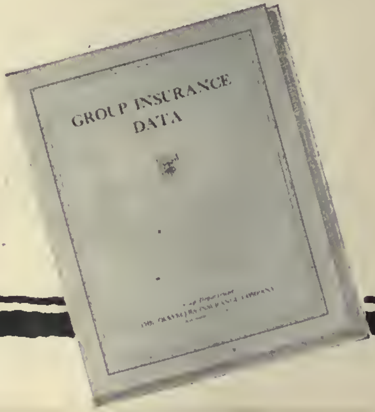

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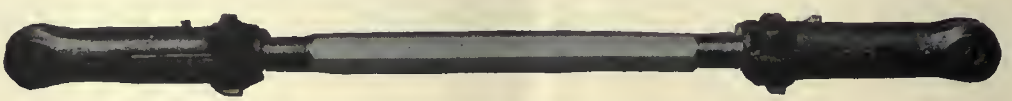

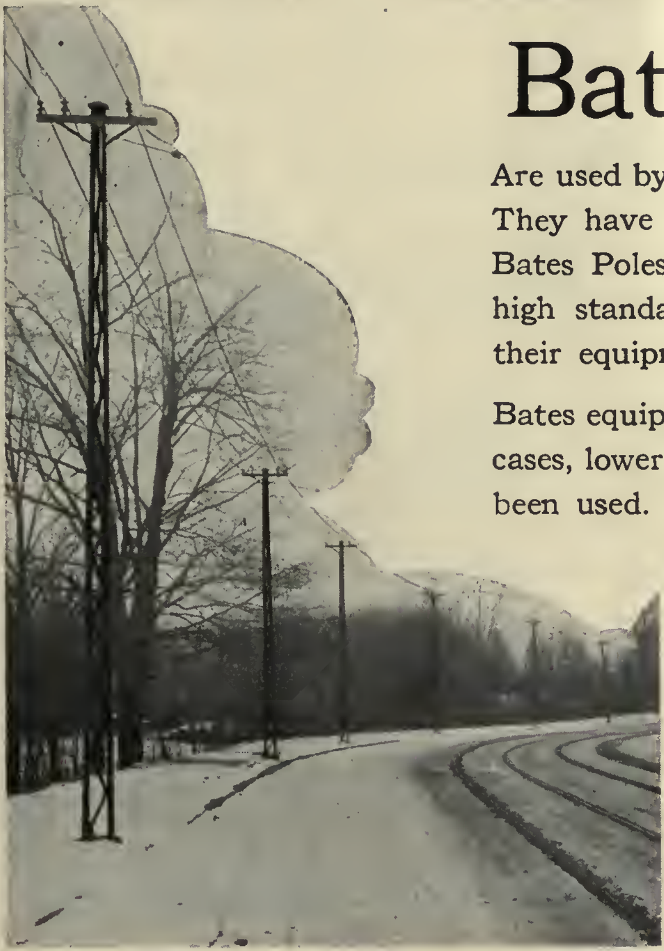

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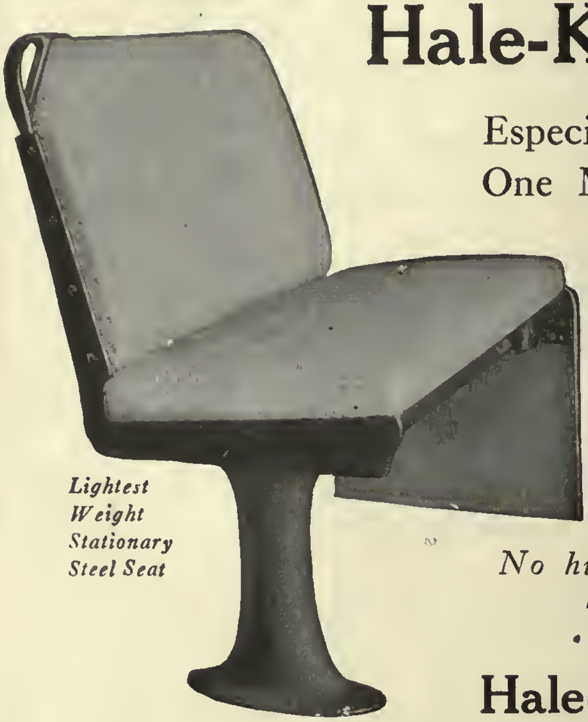

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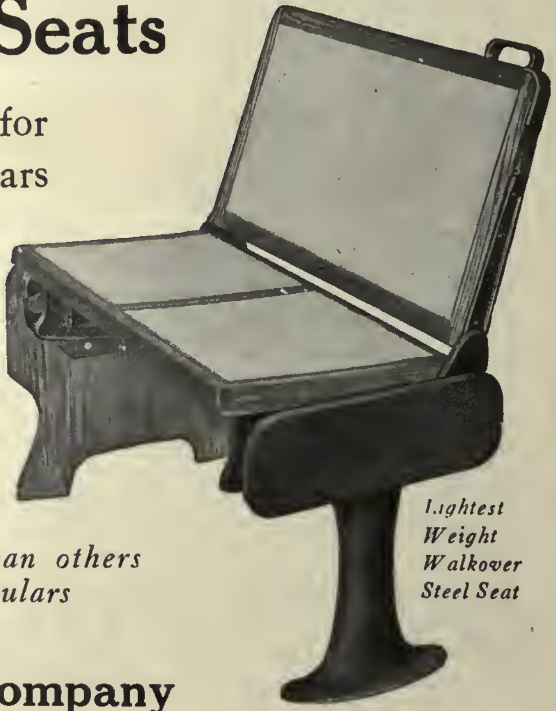

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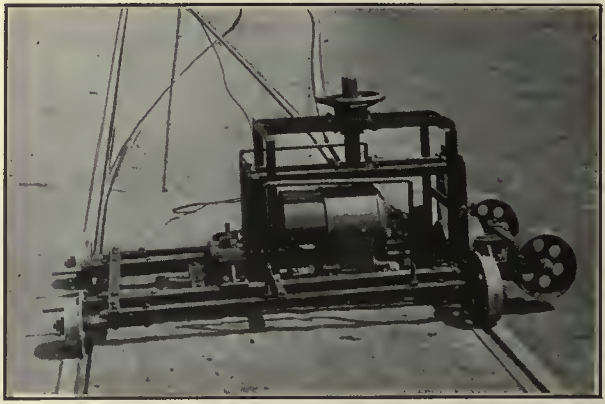

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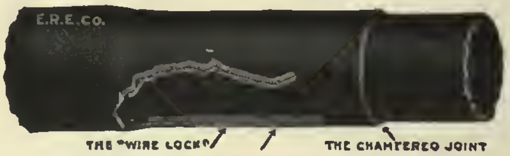

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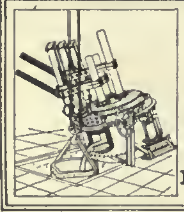
FOSTER SUPERHEATERS
A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
POWER SPECIALTY COMPANY, 111 BROADWAY, NEW YORK
Boston Philadelphia Pittsburgh Kansas City Dallas Chicago San Francisco London, Eng.

A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut

BUCKEYE JACKS
high-grade R. R. Track and Car Jacks
The Buckeye Jack Mfg. Co.
Alliance, Ohio



Moore Rapid Lectromelt Furnaces
Ten Standard Sizes 1/16 to 24 Tons Capacity
Most Rapid and efficient for making
Tool Steels, Alloy Steels, Forging Steels
Steel Castings, Malleable Iron, Grey Iron
Carbide, Ferro-Alloys etc.
PITTSBURGH ELECTRIC FURNACE CORPORATION
P.O. Box 1125. PITTSBURGH, PA.

RAMAPO AJAX CORPORATION
Ramapo Automatic Return Switch Stands for Passing Sidings
RACOR TRADE MARK
RACOR Tee Rail Special Work.
Manganese Construction
GENERAL OFFICES: HILLBURN, NEW YORK
Chicago New York Superior, Wis. Niagara Falls, N. Y.
Canadian Ramapo Iron Works, Ltd., Niagara Falls, Ont.

ALLIS-CHALMERS
MILWAUKEE, WIS. U. S. A.
Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes

Peirce Forged Steel Pins
For Railway Feeders
Designed for heavy duty and has the advantage that it cannot be pulled out of the cross arm.
HUBBARD & COMPANY
Pittsburgh Chicago

FORD

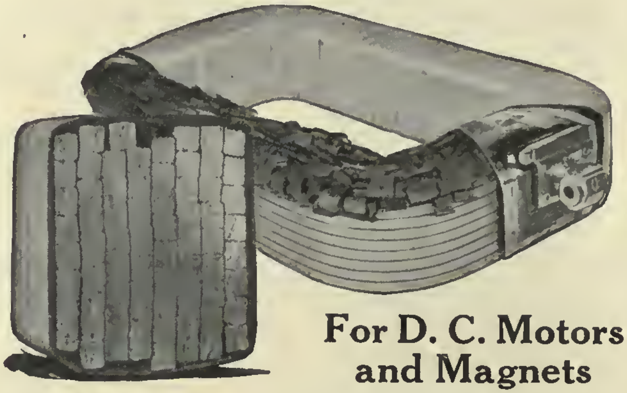
Tribloc Chain Hoists

These hoists have 80 per cent efficiency. For example, an eighty-two pound pull on the chain of a 1-ton Tribloc will lift a ton. Made in capacities from ¼ to 20 tons.

Write for Catalog 5-B

FORD CHAIN BLOCK CO., 2nd & Diamond Sts., Phila. Pa.
Overseas Representatve: Allied Machinery Co. of America
51 Chambers St., New York, N. Y.
2236-D

ALUMINUM



For D. C. Motors and Magnets

Advantages of Aluminum Field Coils—

Permanent insulation.
No baking or charring of insulation.
Uniform distribution of heat.
Quick conduction of heat.
Moisture and heat resisting.
50% to 60% weight reduction.
Brass spools not needed on large coils.
Less chafing due to lighter weight.
Less terminal trouble.
Longer life—less renewals.

Lind Aluminum field Coils have been in use in Europe for the past fifteen years. Since they have been manufactured in America they have been successfully used by more than 60 different companies, and many repeat orders have been placed.

They have the same number of turns as the coils which they replace and since the aluminum oxide insulation is an integral part of the coil, **internal shorts are practically eliminated.** And they are doubly protected against external failures.

If you haven't tried these coils send in an order for a set—there's even a price advantage for many types.

Illustrated Bulletin Sent on Request

Economy Electric Devices Company
L. E. GOULD, Pres.
1590 Old Colony Bldg., Chicago

FIELD COILS

Type R-10

International Registers

Made in various types and sizes to meet the requirements of service on street and city system. Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
15 South Throop Street, Chicago, Illinois

CLEVELAND FARE BOXES

always

Fit the Fare and Fare Collection System

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

Heywood-Wakefield

CAR SEATS

of pressed Steel for all Classes of Passenger Service. Rattan for covering seats and for snow sweepers.

HEYWOOD-WAKEFIELD CO.
Factory at Wakefield, Mass.
Offices at New York, Chicago, San Francisco

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition

---

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

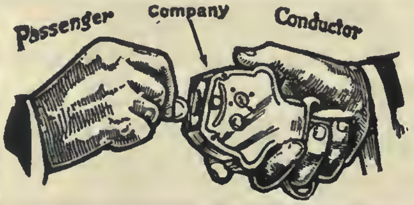
SAMSON CORDAGE WORKS, BOSTON, MASS.

Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
30 Church Street, New York City



Direct Automatic Registration By the Passengers

Rooke Automatic Register Co.
Providence, R. I.

NATIONAL Light Metal Handholds

Attractive
Strong
Sanitary
Long-Lived

Designed to fit the passenger's hand, to make standing as comfortable as possible, and to last so much longer than the ugly, perishable leather straps, that the ultimate cost is far less.

Write for details

Central Equipment Company
Englewood Ave.
Buffalo, N. Y.

Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its **ENDURANCE and ECONOMY.**

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

B. A. Hegeman, Jr., President Charles C. Castle, First Vice-President
Harold A. Hegeman, Vice-President, Treas. and Acting Sec'y
W. C. Lincoln, Manager Sales and Engineering

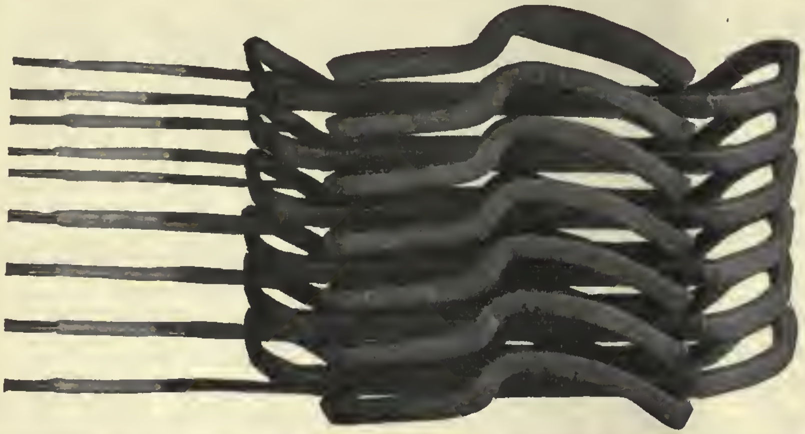
National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St.,
New York

BRANCH OFFICES:
Munsey Bldg., Washington, D. C.; 100 Boylston St., Boston, Mass.; Hegeman-Castle Corporation, Railway Exchange Bldg., Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Pittsburgh Forge & Iron Co.'s Products
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Drew Line Material and Railway Specialties
Genesco Paint Oils
Turnstile Car Corporation Turnstiles
Economy Electric Devices Co.,
Power Saving & Inspection Meters
Fort Pitt Spring & Mfg. Co., Springs
C-H Electric Heaters
Garland Ventilators
E-Z Car Control Corporation Safety Devices
Lind Aluminum Field Coils
Flaxlinum Insulation
National Safety Car Equipment Co.'s One-Man Safety Cars
Anderson Slack Adjusters



Motor Overhaul Is Expensive

Your replacement coils should be absolutely dependable.

More than thirty years experience in the production of armature and field coils for railway motors has qualified us to give you coils which will stand up in the most severe service. They are made in a shop specializing on this work alone. Every job receives the constant supervision of a manager who has made coils ever since the days of coil-wound armatures.

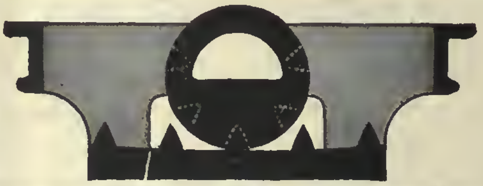
Let us quote you our prices

Elliott-Thompson Electric Co.
Ajax Building, Cleveland, Ohio

N-L VENTILATORS

for Electric Railways and Motor Buses.
Unexcelled for ventilation and appearance.
Write for new catalogue

THE NICHOLS-LINTERN COMPANY
7960 Lorain Ave., Cleveland, Ohio
N-L Products manufactured and sold in Canada by
Railway and Power Engineering Corporation, Ltd.
133 Eastern Avenue, Toronto, Ontario



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

Metal Safety Railway Tie Co.

522 North American Bldg., Philadelphia, Pa.

All-metal cross ties

Types for open and closed tracks
"More flexible than wood"

See advertisement, issue, Sept. 29, page 86.
Ask for circular on either type. ***Prices upon application.***

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100 New Users in the Last Nine Months

KASS SAFETY TREADS

HIGH
in efficiency and lasting qualities
LOW
in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago

SEARCHLIGHT SECTION

EMPLOYMENT-BUSINESS OPPORTUNITIES-EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches	$4.50 an inch
4 to 7 inches	4 30 an inch
8 to 14 inches	4.10 an inch

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E. R. J.

POSITIONS VACANT

ACCOUNTANT, experienced in electric railway accounting and capable of assuming full control of all accounting work for small electric railway. State present and former connections, present salary and salary desired and reason for change. Communications will be treated confidentially. P-612, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

SHOP foreman wanted to take charge of a car house shop operating 45 cars, near New York City. State experience and salary expected. P-610, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

SUPERINTENDENT of equipment or master mechanic having wide experience and ability in maintenance of all types of equipments, open for immediate employment. PW-613, Elec. Railway Journal, Real Estate Trust Bldg., Phila., Pa.

Why Save It?

Equipment you have replaced, or for which you have no further use can probably be sold at a good price now. Later it may not be worth as much.

Weed out equipment and let a

"Searchlight" Ad

help you sell it promptly

G-9

FOR SALE

1100 tons, 70 lb. A.S.C.E. Relaying Rails, 300-400-500 K.W.H. 25 Cycle Rotary Converters and Line Fixtures.

Receiver, Interurban Railway & Term. Co.
1112 2nd Nat'l Bank Bldg., Cincinnati, O.

A. S. C. E. 85S

We can supply up to 500 tons new 85-lb. Rails, first quality, standard lengths, with necessary angle bars.

HENRY LEVIS & CO.
Commercial Trust Bldg., Philadelphia.

FOR SALE

50—G. E. No. 80-A Motors.
50—Controllers, K-28-B; K-12.
35—B-2 Compressors.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

11 Tomlinson Radial Couplers

TRANSIT EQUIPMENT COMPANY
501 Fifth Avenue, New York.

Good Relaying Rails

Are as Serviceable as New Rails, with a Big Saving on the Price

We have ready for prompt shipment First-Class Relaying Rails in various weights. Get in touch with us, stating what weight rail and tonnage desired, and we will submit quotations.

HYMAN-MICHAELS COMPANY
531 Peoples Gas Bldg., Chicago
OFFICES AND PLANTS AT
St. Louis, Mo. Detroit, Mich.
Pittsburgh, Pa.
1324 Woolworth Bldg., New York City.
San Francisco, Cal. McKees Rocks, Pa.

FOR SALE

TRANSFORMERS

3—New 200 kva., 60-cy., single phase, 13200/2300-v. General Electric Transformers, complete with oil. Immediate delivery.

THE TOLEDO & INDIANA RAILROAD CO.
714-718 Washington St., Toledo, Ohio

The Buyer
The Employer

The Agent
The Seller

The Employee
The Dealer

You can reach them all through the

SEARCHLIGHT SECTION

"Searchlight" ads are quick acting. They usually bring prompt returns. There is no better way to reach the men of this industry at small cost.

For Every Business Want *"Think* SEARCHLIGHT *First"*

0135

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers, Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Westinghouse E. & M. Co.

Babbitt Metal
Ajax Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
Internat'l Register Co., The

Bearings and Bearing Mentals
Ajax Metal Co.
Bemis Car Truck Co.
General Electric Co.
Gilbert & Sons, B. F. A.
Westinghouse E. & M. Co.

Bearings Center and Roller Side
Baldwin Locomotive Wks.
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car-Heating Co.
Elec. Service Supplies Co.

Boilers
Babcock & Wilcox Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Ry. Imp. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.

Bonds, Rail
American Steel & Wire Co.
Elec. Ry. Imp. Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Brackets and Cross Arms (See also Poles, Ties Posts, etc.)
Bates Exp. Steel & Tr. Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.

Brakes, Brake Systems and Brake Parts
Ackley Brake & Supply Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
U. S. Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Buses, Motor
Brill Co., The J. G.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables (See Wires and Cables)

Cambric, Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Cars, Dump
Differential Steel Car Co.
St. Louis Car Co.

Cars, Passenger, Freight Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
M'cGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co
Transit Equipment Co.

Cars, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Change Carriers
Cleveland Fare Box Co.

Circuit Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Elec. Ry. Equipment Co.
Ele . Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Economy Elec. Devices Co.
Elec. Service Supplies Co.

Coils, Armature and Field
Elliot-Thompson Elec. Co.
General Electric Co.

Coils, Choke and Kicking
General Electric Co.
Westinghouse E. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co.
Elec. Service Supplies Co.
Internat'l Register Co., The

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrapping Machines
Cleveland Fare Box Co

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec. Mfg. Co.
Westinghouse E. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condensor, Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Dossert & Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car-Heat'g Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
Anaconda Copper Min. Co.

Cord, Bell, Trolley, Register etc.
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co., The
Roebling's Sons Co., J. A.
Samson Cordage Works
Silver Lake Company

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood. Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes
Allis-Chalmers Mfg. Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.

Crossing Foundations
International Steel Tie Co.

Crossing Frog and Switch
Ramapo Ajax Corp.
Wharton, Jr., & Co., Wm.

Crossing, Manganese
Ramapo Ajax Corp.

Crossings Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Crushers, Rock
Allis-Chalmers Mfg. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Elec. Service Supplies Co.
Morton Mfg. Co.

Dealers, Machinery
Electric Equipment Co.
Hyman, Michaels Co.
Interurban Ry. & Term. Co., Receiver
Levis & Co., Henry
Toledo & Indiana Ry. Co., The
Transit Equipment Co.

Derailing Devices (See Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish Service, P. Edward

Door Operating Devices
Consolidated Car-Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Draft Rigging (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Sup. Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Ohio Brass Co.

Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Electric Grinders
Seymour Rail Grinder Co., E. P.
Railway Track-work Co.

Electrodes, Carbon
Railway Track-work Co.

Electrodes, Steel
Railway Track-work Co.

Enamels
Beckwith-Chandler Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Bibbins, J. Rowland
Buchanan & Láyng
Day & Zimmerman
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Kelly Cooke Co.
Ong, Joe R.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Engineering Corp., The J. G.
Wortham, Edwin

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Fare Boxes
Cleveland Fare Box Co.
National Ry. Appliance Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Elec. Service Supplies Co.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
Godwin Co., Inc., W. S.

Forgings
Carnegie Steel Co.

Frogs and Crossings, Tee Rail
Ramapo Ajax Corp.

Frogs, Track
(See Trackwork)

Frogs, Trolley
Ohio Brass Co.

Furnaces, Electric
Pittsburgh Elec. Furnace Corp.

Fuses and Fuse Boxes
Consolidated Car-Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
Columbia M. W. & M. I. Co

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse E. & M. Co

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.

Gear Cases
Chillingworth Mfg. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co

Gears and Pinions
Ackley Brake & Supply Corp.
Bemis Car Truck Co.
Elec. Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Girder Rails
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders, Portable
Buda Co.
Railway Track-Work Co.

Grinders, Portable Electric
Seymour Rail Grinder Co., E. P.
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Hand Holds
Central Equip. Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Elec. Service Supplies Co.
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel Co.

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Heaters, Car (Electric)
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car (Stove)
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Helmets, Welding
Railway Track-work Co.

Hoists and Lifts
Ford-Chain Block Co.
Ingersoll-Rand Co.

Hose, Bridge
Ohio Brass Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.

Indicating Signals
Oskel Equipment Co.

Instruments, Measuring and Recording
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Standard Underground Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Anderson Mfg. Co., A. & J. M.
Elec. Ry. Equipment Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.

Insulation, Slot
Irvington Varnish & Ins. Co.

Insulators (See also Line Material)
Anderson Mfg. Co., A. & J. M.

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

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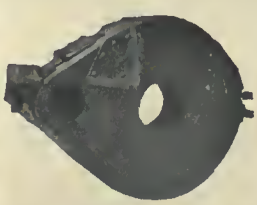

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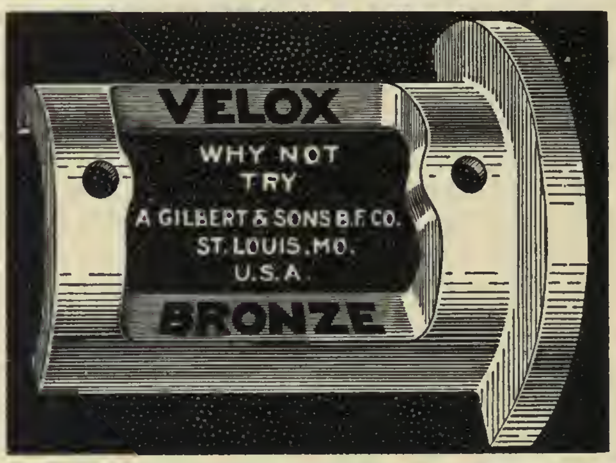
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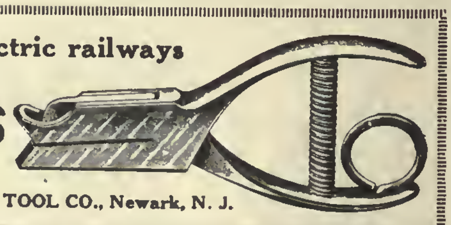

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The recent introduction of the Brill 79-EX Truck for short length cars added another type to the already extensive list of Brill trucks. In this complete line can be found types suitable for every class of service and variety of conditions. For short-length or long cars, light or heavy cars, passenger or special-purpose cars, motor or trailer and city, suburban or high-speed interurban service, there is a type of Brill truck particularly suited to the requirements.

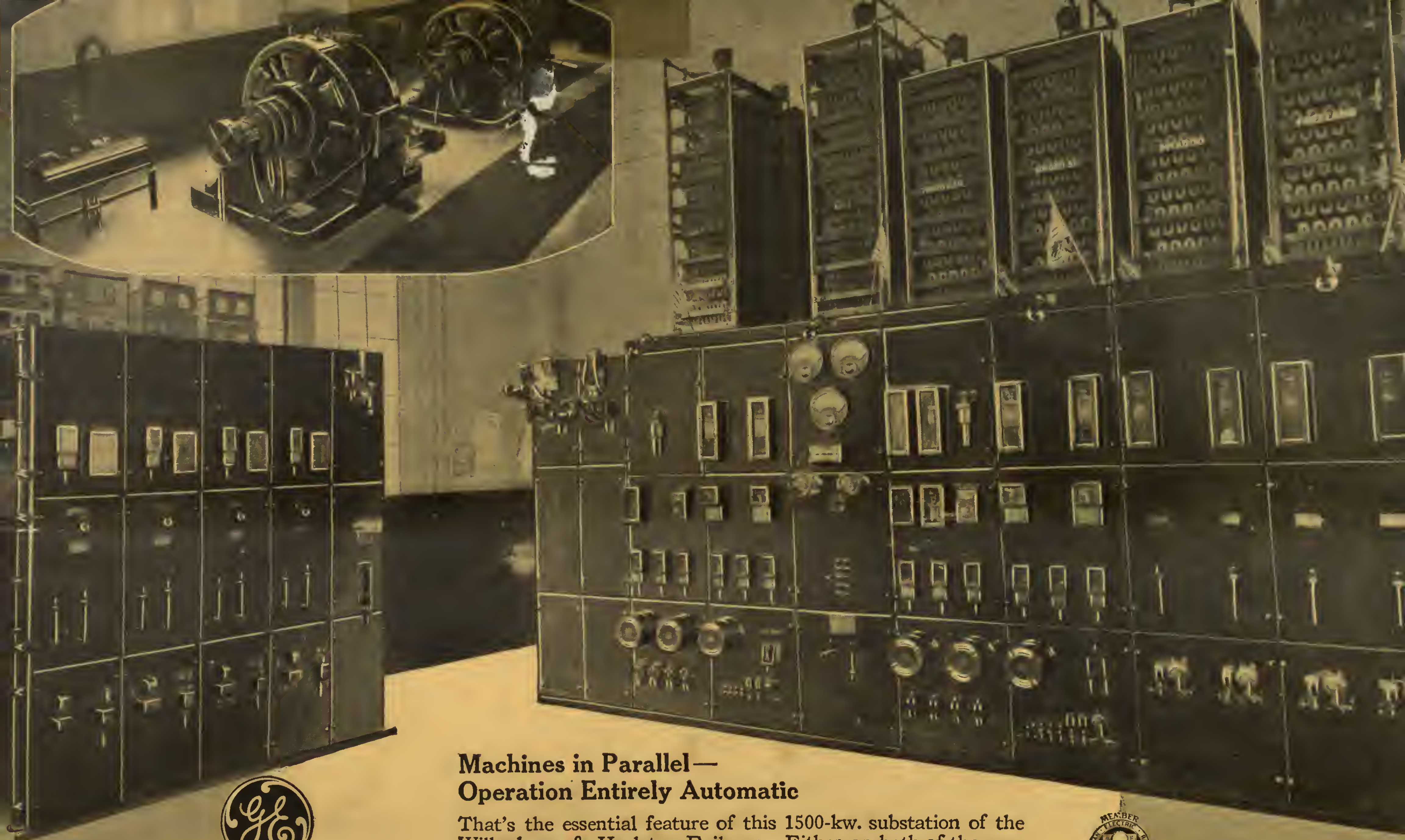
Every type truck has its own distinctive field. Therefore, before deciding upon your new truck equipment, our Engineering Department will be glad to furnish you with their recommendations.

Bulletins covering any of our standard trucks will be furnished upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. — ST. LOUIS MO. — G. C. KUHLMAN CAR CO. — CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

Cars and Trucks



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